R. R. KELLY, 26 MAY 77

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIX. No. 732.] LONDON, MAY 22, 1877. [29TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—12,000 cubic feet of gas per ton of coal; 28-candle gas; coke, 66·70 per cent.; volatile matters, 33·30 per cent. Coke of good quality.

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These Paints are now used in 150 Country Gas-Works, and by all the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.

They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.

The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov.* 2, 1866.

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J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.

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Established at the commencement of Gas Lighting.
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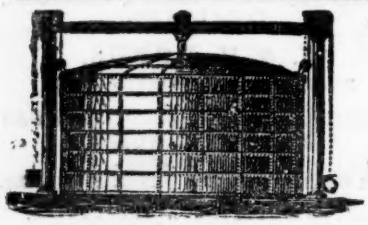
Now ready, GAS CHANDELIER BOOK (Reduced Prices), 7s. 6d.



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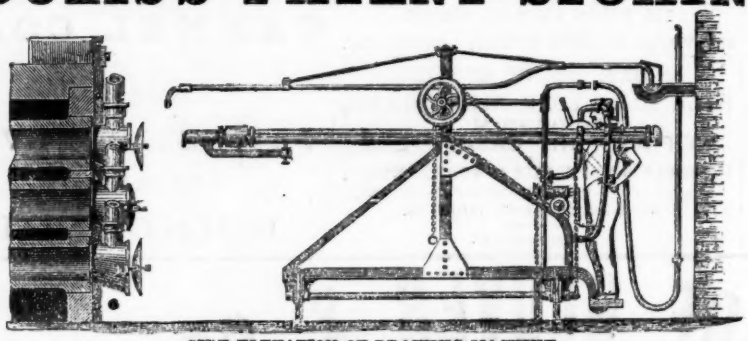
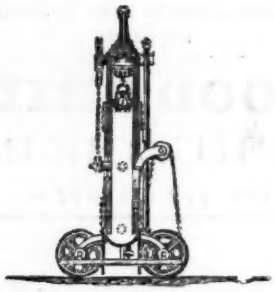
FOULIS'S PATENT STOKING MACHINE.



SIDE ELEVATION OF DRAWING MACHINE.



END ELEVATION.

(*The Charging Machine will be Illustrated in next week's Advertisement.*)

Makers: TANGYE BROTHERS and HOLMAN, London and Birmingham; ADAM WOODWARD and SON, Manchester; ROBERT LAIDLAW and SON, Glasgow; MASCHINENBAU-ACTIEN-GESELLSCHAFT HUMBOLDT, Kalk bei Deutz:
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SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 800 days, and are yet in good order. References on application.

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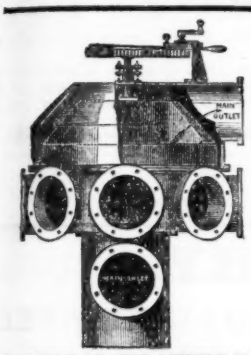
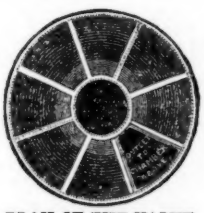
C. & W. WALKERS'

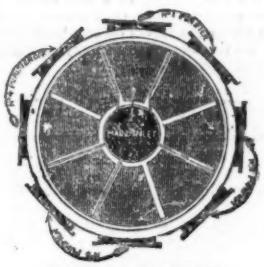
PATENT CENTRE-VALVES.



ELEVATION OF THE CENTRE-VALVE.



PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

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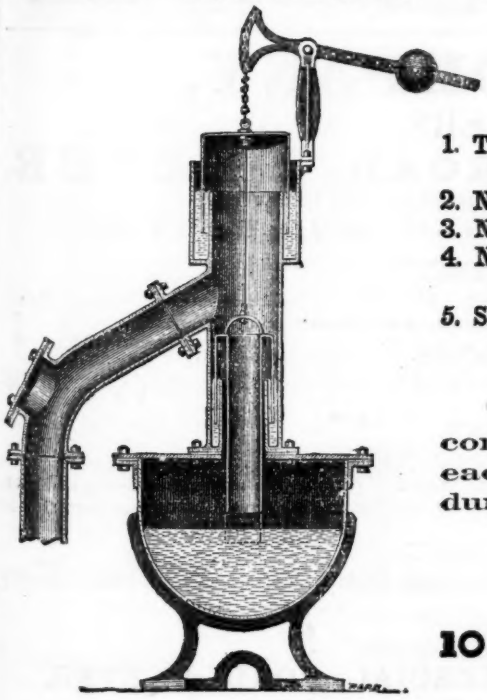
SELF-ACTING REMOVABLE DIP-PIPE,

PATENTED BY

CHANDLER & STEVENSON.



ADVANTAGES.

1. There is no pressure on the Retorts.
2. No deposit of Carbon.
3. No scurfing is required.
4. Never a choked Ascension-Pipe.
5. Saves Fuel and Wear and Tear.
6. Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7. Is never out of order.
8. Requires no attention.
9. Is perfectly automatic in its action.

These Dip-Pipes can now be supplied complete, except the flanched bend, for £4 each, which includes the charge for licence during the whole term of the patent.

Applications to be made to

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Who fix the Dip-Pipes, at a small Charge, when required.

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"WET" & "DRY" GAS-METERS IN IRON & TIN-PLATE CASES,

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Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

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INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

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STATION-METERS OF ALL SIZES, with PLANED JOINTS;

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

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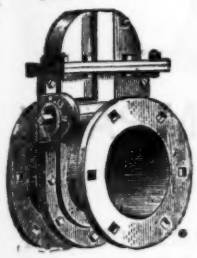
LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

B. DONKIN & CO.'S

IMPROVED GAS-VALVES

WITH WROUGHT-IRON PINIONS.



List of prices, with full dimensions of all sizes up to 48-inch, to be had on application.

These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.

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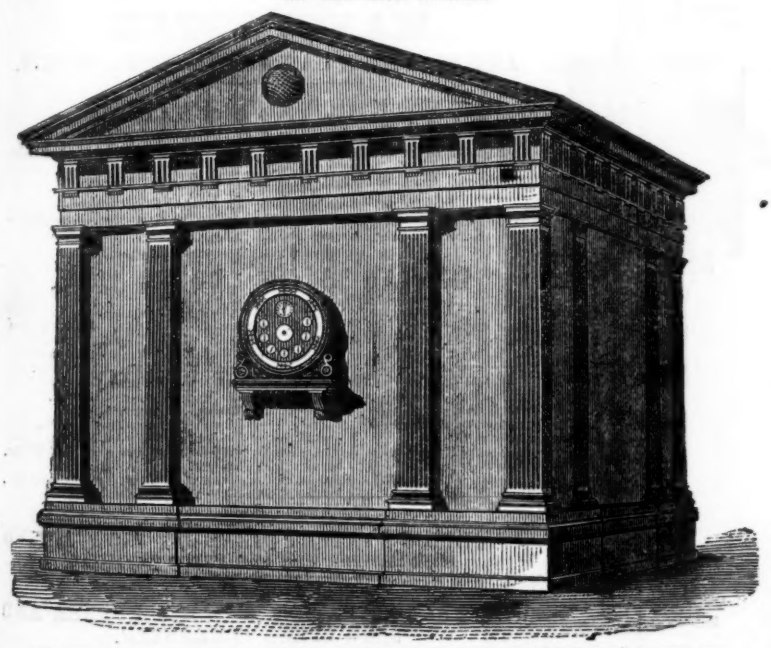

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TERMS, &c., ON APPLICATION.

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
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GAS-RETORTS, GLASS-HOUSE FURNACE,
BLAST-FURNACE, TANK BRICKS, LUMPS, TILES,
And Every Description of Best Fire-Bricks.

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PROPRIETORS OF THE
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Of all Dimensions for Gas-Works,
GLASS-HOUSE POTS & CRUCIBLES
Of every kind.
The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture.

"SELLARS' CEMENT"
PREVENTS WASTE OF GAS FROM RETORTS;
SAVES CLAY RETORTS FROM DESTRUCTION BY FIRE;
GREATLY ECONOMIZES THE USE OF FIRE-BRICKS;
And PREVENTS ALL POSSIBLE LOSS of GAS FROM LEAKAGE.
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THE GAS CEMENT WORKS,
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GAS AND WATER PIPES.
WILLIAM MACLEOD & CO.,
18 & 20, ALSTON STREET, GLASGOW.
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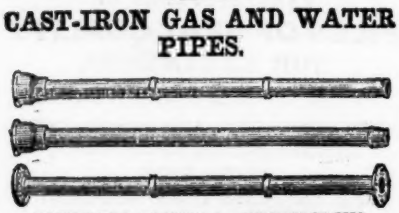

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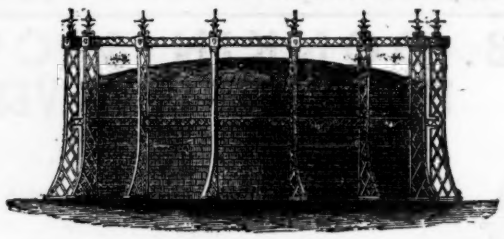
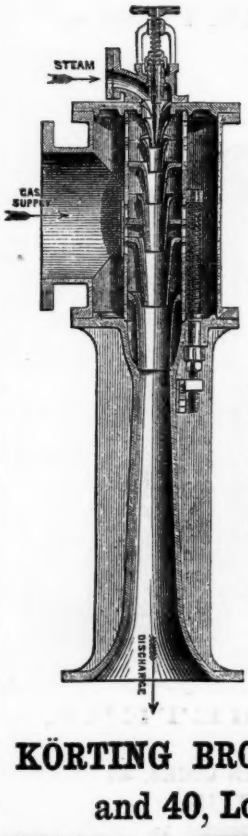
AND ALL MATERIALS FOR GAS MANUFACTURE AND DISTRIBUTION.



THE HORSELEY COMPANY,
LIMITED,
TIPTON, STAFFORDSHIRE.
LONDON OFFICE:
6, WESTMINSTER CHAMBERS, VICTORIA STREET,
GAS ENGINEERS, IRONFOUNDERS, &c.,
MANUFACTURERS OF
GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,
AND ALL REQUISITES FOR EITHER
GAS OR WATER WORKS;
ALSO
MAKERS OF ROOFS, BRIDGES, &c.

KÖRTING BROS.,
Steam-Jet Engineers,
7 and 17, LANCASTER AVENUE,
MANCHESTER,
AND 40, LOWER GARDINER STREET, DUBLIN.



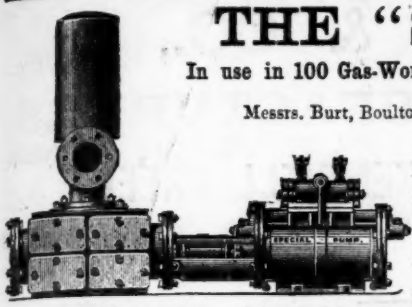
E. KÖRTING'S PATENT
STEAM-JET GAS-EXHAUSTER.
IMPROVED CLELAND'S PATENT.
Small Cost—Compactness—Perfectly Self-Acting—Self-Regulating—Self-Cleansing—No Steam-Engine—No Attention—No Extra Room Required—No Wear and Tear—No Noise—No Oscillation in Vacuum, or Back Pressure.
UPWARDS OF 200 IN USE.
SUPPLIED TO—

Chartered Gas Co.	Glasgow Corporation.	Hanna, Donald, and Wilson, London.
London Gas Co.	Leyland Gas Co.	Ratcliff Gas-Works.
S. Metropolitan Gas Co.	Stalybridge Gas-Works.	Kendal Gas-Works.
Phœnix Gas Co.	Lincoln Gas-Works.	Longton Gas Co.
Liverpool Gas Co.	Birmingham Gas-Works.	Dartford Gas Co.
Bolton Corporation.	Wakefield Gas-Works.	Exeter Gas Co.
Horsham Gas Co.	Brentford Gas-Works.	Harrogate Gas Co.
Epsom and Ewell Gas Co.	Burnley Gas-Works.	Hertford Gas Co.
Ipswich Gas Co.	Guildford Gas-Works.	Waterside Gas-Works, Todmorden.
Cheltenham Gas Co.	Gloucester Gas-Works.	F. W. Grafton and Co., Accrington.
Sandwich Gas Co.	Kirkintilloch Gas-Wks.	
Cornholme Dis. Gas-Wks.	Nantwich Gas-Works.	
Bury Gas-Works.	Enniskillen Gas-Works.	
	&c., &c., &c.	

E. KÖRTING'S PATENT STEAM-JET REVIVIFYING BLOWERS FOR THE PURIFYING MATERIAL.
SOLE LICENSEES FOR
W. CLELAND'S PATENT STEAM SCRUBBER AND SLOW-SPEED CONDENSER.
FOR PARTICULARS, APPLY TO
KÖRTING BROS., 7 and 17, Lancaster Avenue,
MANCHESTER,
and 40, Lower Gardiner Street, Dublin,
OR TO
GERALD J. TUPP, 8, John Street, Adelphi, W.C.,
LONDON,
SOLE AGENT FOR ENGLAND AND WALES.

THE "SPECIAL" STEAM-PUMP.

In use in 100 Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.



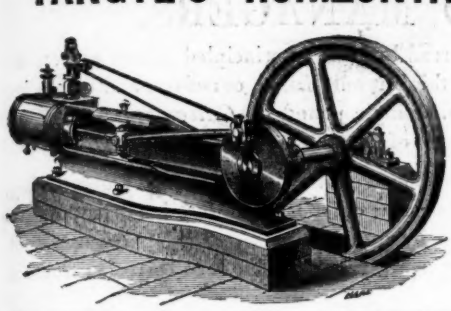
Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

200 Sizes made. The following are the Leading Sizes for Gas-Works:—

Steam Cylinder . . .in.	3	4	3	5*	5*	4	6*	5	7*	6	8*	7	10*
Water Cylinder . . .in.	1½	2	3	2½	3	4	4	5	5	6	6	7	7
Gallons per hour . . .	450	815	1830	1250	1830	3250	3250	5070	5070	7330	7330	9750	9750
Price	£16	£18	£18	£21	£22½	£25	£30	£32½	£40	£40	£50	£50	£65

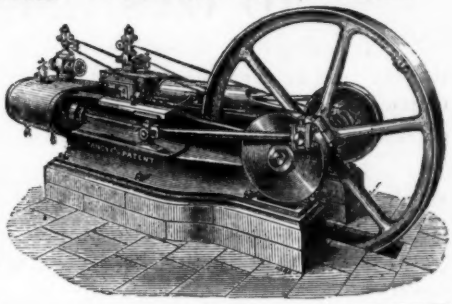
* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

TANGYE'S HORIZONTAL HIGH-PRESSURE STEAM-ENGINES.

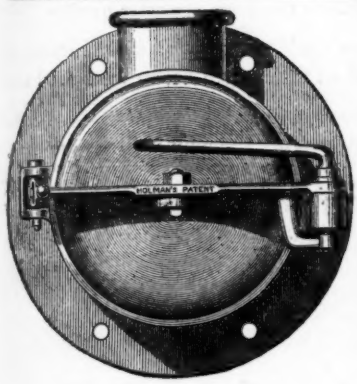


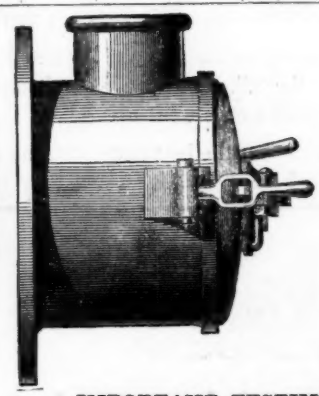
THE DESIGN,
WORKMANSHIP,
AND
LOW PRICE
OF THESE ENGINES
HAVE CALLED FORTH
UNIVERSAL APPROVAL.

Over 2000 Sold
Since December, 1869.



SIZE	B	C	D	E	G	H	I	J	K	M
	TWO	THREE	FOUR	SIX	EIGHT	TEN	TWELVE	FOURTEEN	EIGHTEEN	TWENTY-FIVE
Nominal Horse Power										
Price of Engine, with Governor	£28 0	£38 0	£46 0	£70 0	£90 0	£115 0	£127 0	£140 0	£195 0	£220 0
Feed-Pump, extra.	3 0	3 15	4 0	5 10	6 0	7 10	7 10	8 0	10 0	15 0
Variable Expansion Gear, extra	..	..	..	..	13 0	14 0	15 0	15 0	20 0	25 0





MORTON'S
Patent Self-Sealing
RETORT LIDS,

WITH

HOLMAN'S NEW PATENT BRACKETED CROSS-BARS, ANTI-FRICTION CATCHES, AND ECCENTRIC FASTENINGS.

Instantaneous Sealing effected. No Luting. No Duplicate Lids required. Holman's New Self-Sustaining Cross-Bar ensures freedom of joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested (rigid cast iron is now successfully employed), nearly 25,000 being in use at various Gas-Works in London and the Provinces.

IMPORTANT TESTIMONIAL.

The Gaslight and Coke Company (commonly called the Chartered Gas Company), Beckton, North Woolwich.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them. I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly, (Signed) G. C. TREWBY.

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

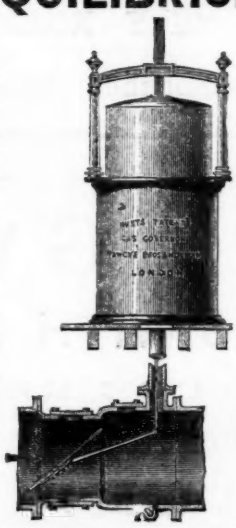
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at any convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dronfield, Dursley, Exeter, Guernsey, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,

(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION TO

TANGYE BROTHERS & HOLMAN,

SOLE MANUFACTURERS,

LAURENCE POUNTNEY LANE, LONDON, E.C.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

TO GAS ENGINEERS AND MANAGERS.

It having come to our knowledge that a report is in circulation, spread by some unprincipled person or persons, that the cases of our larger-sized Meters are made of Galvanized Iron, we think it only fair to ourselves, and just to our customers, to say, that we never have used, in making any of our Meters, a single pound of *Galvanized Iron*, or any other *cheap* and *inferior material*, and this can be easily seen by opening any of them.

The cases of our large-sized Meters, from 20 lights and upwards, are all made of the very *Best Best Patent Alloy*, which is nearly double the price, and will last more than double the time, of some other material that has been and still is very largely used for the same purpose. And our experience, acquired by an extensive use of it for upwards of 30 years, enables us to say with confidence that no other metal in use for the purpose is so little liable to corrosion from the action of the gas.

We have now in use a Meter made in 1848, and therefore 29 years old, the case of which is made of Patent Alloy; the Meter is still in perfect order, and shows no signs of decay.

The utmost care is exercised by us in selecting none but the very best materials for all parts of our Meters; much of it is made *expressly for us*, as it is not possible to obtain it in the open market of the same superior quality.

The great fall in the price of all materials used in making our Meters has enabled us to give an increased discount, thus giving our customers the benefit of the fall. This we were bound in fairness to do, as we raised the price of our Meters four years ago, when the price of all metals went up.

It will be our constant endeavour, by using none but the best materials, and employing the most skilful workmen, to maintain the high character our Meter has hitherto borne.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

CONTENTS.

Circular to Gas Companies:— PAGE

The Sulphur Question in Parliament . . . 777
The Metropolitan Board and the Sulphur Question . . . 777
The Electric Candles . . . 777
Mr. Raikes in a Difficulty . . . 777
The Liverpool Gas-Fitting Company . . . 777
A Suggestion to Directors of Gas Companies . . . 778
Purchase of the Blackburn Gas-Works . . . 778
Proposed New Gas-Works at Neath . . . 778
Purchase of the Mansfield Gas Company . . . 778
Gas Affairs at Hull . . . 778

Water and Sanitary Notes:—

Kent Water-Works Company and the Metropolitan Board . . . 778
The Boring at Messrs. Meux's . . . 778
Waste of Water at Glasgow . . . 778
Barff's Process for the Prevention of Corrosion of Iron . . . 779

Leading Article:—

A Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas . . . 779

Correspondence:—

Still's Registered Gas-Purifier . . . 780
Sale of the Blackburn Gas-Works . . . 780
A Suggestion to the Directors of Gas Companies . . . 780
Aitken and Young's Process of Gas Manufacture . . . 780

Legal Intelligence:

Supreme Court of Judicature—Court of Appeal—*In re* the New Gas Company . . . 780
High Court of Justice—
Chancery Division—
Beale *v.* Gwynne . . . 780
Simmonds *v.* The Vestry of Richmond . . . 781
Queen's Bench Division—Regina *v.* The Colne Valley Gas Company . . . 781
Combmartin Petty Sessions—Alleged Nuisance at the Ilfracombe Gas-Works . . . 782
Central Criminal Court—Embezzlement by the Assistant Secretary of the Colney Hatch Gas Company . . . 782

Miscellaneous News:—

Neath Corporation Gas-Works . . . 779
Audley Gas-Works . . . 782
Metropolis Gas Supply . . . 782
Metropolis Water Supply . . . 783
Death from Inhaling Coal Gas . . . 784
Transfer of the Blackburn Gas-Works to the Corporation . . . 784
West of Scotland Association of Gas Managers . . . 785
Ashbourne Gas Supply . . . 787
Southern District Association of Gas Managers . . . 787
Trade Reports . . . 787
Birmingham Water Supply . . . 788
Glasgow Water Supply . . . 788
Brighton Corporation Water-Works . . . 788
Falkirk Joint-Stock Gas Company, Limited . . . 788
Leeds Corporation Gas-Works . . . 788
Gas Explosion in Southwark . . . 788
Liverpool Gas-Fittings Company, Limited . . . 788
Richmond (Surrey) Water Supply . . . 788

SUPPLEMENT.

Parliamentary Intelligence:—

Progress of Bills in House of Lords . . . 805
Progress of Bills in House of Commons . . . 805
Lowestoft Water, Gas, and Market Bill . . . 805
House of Lords Committee—Londonderry Gas Bill . . . 805
House of Commons Committees—
Ashton-under-Lyne Gas Bill—Ashton-under-Lyne Improvement Bill . . . 807
Crystal Palace District Gas Bill . . . 809

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MAY 22, 1877.

Circular to Gas Companies.

THE "sulphur fight" has been, as we anticipated it would be, adjourned over the holidays, and the decision of the Committee will not be given until after another fortnight. In the meantime, we have certain utterances of the Chairman which, while giving us no hint from which we might infer the probable fate of the Chartered Company's Bill, show the points which have caught the attention of the Committee. They appear to think that, while the damage alleged to be done by the sulphuric acid produced by the combustion of the sulphur compounds in gas is hypothetical, problematical, or exaggerated, the nuisance occasioned by the use of lime is positive, real, and substantial. At the same time, they seem to recognize the fact that the abolition of purification by means of lime will result in a considerable saving to the Gas Company, and the idea has been expressed that the public should have the benefit of this economy. It will be seen at once that the question of price not being raised by the Bill now before the Committee, the introduction of a clause to alter the existing law in this respect would involve a fundamental change in the nature of the measure, which, promoted with one object, would thus become the instrument of effecting a second. How far parliamentary usages will justify the course which it is pretty clearly intimated may be taken, we are unable to say. The Committee have a Bill before them which they may pass or reject after having weighed the evidence adduced for and against. For any alteration or addition to the measure the consent of both parties is necessary, and we think we may take it that the alternative proposition of the Committee will be obnoxious to both. The Company could hardly assent to a reduction of the initial price, which is already low enough, and which was settled after a very full inquiry last year; and the opposing authorities would stultify themselves if they accepted such a reduction in price as compensation for the damage they allege, and for nuisances they contend ought not to exist.

There is a further suggestion, that the Committee should pass the Bill with a clause, or clauses, fixing a new maximum of thirty-five or forty grains of sulphur per 100 feet, and giving the Board of Trade power to order the Companies to make experiments, under superintendence, with a view to ascertain whether the above-mentioned maximum may not, in course of time, be reduced without any nuisance being occasioned. A good deal might be said in favour of this proposal, which would leave the Referees pretty much in the position they now stand. We must not, however, discuss the suggestions made to the Committee, nor the opinions expressed by themselves. The decision of the Committee will be anxiously waited for, and, whatever it may be, we expect it will involve another contest in the Upper House.

The same reasons which compel us to abstain from any comment on the position taken up by Mr. Plunket's Committee, of course, preclude us from making any remarks on the extract from the Report of the Metropolitan Board of Works, which we publish to-day. It is, however, open to us to call attention to the fact that, while the Board strongly object to the removal of all restrictions on the quantity of sulphur to be allowed in metropolitan gas, their statement in this report seems to leave the way open to compromise, the design of which has been clearly indicated in the evidence given, but which the Committee appear not to have approved. It seems with them, as we said before, to be a question of giving the Company the relaxation they ask, accompanied by a reduction of the initial price, or of continuing the conditions from which the Company seek to be relieved.

We have received, from an intelligent informant, some particulars respecting the "electric candles," as recently exhibited in Paris, which we give, without guaranteeing their strict accuracy. We are told, then, that the machine used by M. Jablochskoff was one of Gramme's (the inventor whose name escaped our memory), which, driven by a two-horse power engine, and supplying electricity to one lamp, gives a light equal to six hundred candles. The Russian inventor has succeeded in dividing the current produced by this machine, so as to supply *two* "electric candles." That, we are told, is all, and by those competent to form an opinion, the candle is not as yet considered a success. It is not to be disputed, however, that the invention is a great step in advance. If an electric current can be divided into two, there would appear no reason why it should not be subdivided into twenty; but even if that were done, Gas Companies would not be in the least prejudiced. While writing on this matter, we may remark that some activity is being displayed in England with respect to illumination by electricity, and we read in a contemporary that the Messrs. Siemens, who may well be supposed to take an interest in the question, have lighted up the shops at their telegraph works at Woolwich with three machines, driven by about six-horse power, and the effect is said to have been good.

Mr. Raikes had a little difficulty before him the other day. The Lowestoft Water, Gas, and Markets Company had a Bill in the Commons, by which they proposed to raise additional capital to the amount of £80,000, but they did not apportion their capital among the several undertakings, and the Company seems to be one and indivisible. It seems, moreover, to be in a bad way, paying only two and a half per cent., and the shares selling at a heavy discount. Thus the insertion of auction clauses in the Bill promised no good to anybody, and they were left out.

Our readers have been informed that, subsequent to the fire at the landing-stage, the Liverpool United Gas Company dissociated the business of gas-fitting, &c., from the general concern, and a separate Company, with a paid-up capital of £10,000, was formed to take over this branch of the undertaking. That Company held their first annual meeting on the 15th inst., and the accounts presented showed that the profits of the year amounted to £1636. A dividend of ten per cent. was declared, and the balance was carried over to the next year. We hope the fitting

business will continue to prosper. When the Gas Company are compelled to go to Parliament they will have auction clauses inflicted on them. The Liverpool Gas-Fitting Company will never go to Parliament. Might not several Gas Companies split up their business in a similar way?

A suggestion is made by a correspondent this week, in support of which we may, very properly, say a few words. It is, that the Directors of Gas Companies should give some pecuniary contribution towards the expenses of their officers who attend the meetings of the British Association of Gas Managers. Everybody knows—that is, everybody who has any knowledge of the matter—that gas managers, as a rule, have very small salaries. Even with a house, and coal and gas free, some of them find it hard enough to make both ends meet, even at home. We regard, however, the advantage of these annual gatherings as so great, that we have always advised managers to be members of the Association, and to attend the meetings. But the benefits are mainly conferred on the Company the manager represents. He is, of course, personally instructed, and the knowledge he gains is always at the service of his employers, who may be considered to reap the pecuniary advantage of his communications with his brother managers. We hope Gas Directors will take the matter into consideration in the course of the next week or two. The meeting of the Association, which will shortly take place at Bristol, promises, we are told, to be a very useful one, and we hope there will be a full attendance of members, whether aided or not.

A report in another column shows that the Corporation of Blackburn have ratified the agreement made by a Committee with the Company for the purchase of the gas undertaking. The terms are said to be higher than any yet paid by a Corporation for a gas undertaking, but this we believe to be a mistake. It may, however, be admitted that the terms are liberal. The holders of A shares, of £15 each, fully paid, and entitled to ten per cent., obtain a perpetual annuity equal to maximum dividends, and a bonus of £2 per share; the holders of B shares, of £15 each, fully paid, and entitled to seven and a half per cent., also receive annuities equal to maximum dividends, and a bonus of £2 per share. The bonuses, it must be understood, are to compensate for back dividends, which the Company are now in a position to make up. The owners of C shares, nominally of £10, on which only £5 have been paid, are compensated for their uncalled-up capital by a bonus of £3 10s. per share, with annuities of 7 per cent. on the capital paid up. There is no denying that those terms are very fair, but the Gas Company were in a position to go on making their maximum dividends, so far as can be seen at present, for all time to come. They had, therefore, a perfect right to stand out for the highest terms they could get. They had nothing to fear from either auction clauses or sliding scale if imposed at some remote date. The Corporation have now a fair start. If the consumption of gas continues to increase as it hitherto has done, at the rate of six and a quarter per cent. per annum, the undertaking will, in the course of a few years, become very profitable. The only people, we imagine, who are to be pitied, are the gas consumers, who are not likely to get cheaper gas in consequence of the transfer. Everybody in Blackburn, however, seems to be perfectly satisfied.

The Corporation of Neath have decided on erecting new gas-works at an estimated cost of £10,000, those they took over from the Gas Company two or three years ago, having been allowed, perhaps intentionally, to fall into a state of dilapidation. It is said that the new works are to be placed on a more eligible site than that occupied by those taken over from the Company. It may be presumed that the purchase of the undertaking has been profitable to the Corporation, or they would not so soon have resolved on so heavy an expenditure in connexion with it.

Some alterations, not of great moment, have been made in the agreement entered into between the Town Commissioners of Mansfield and the Directors of the Gas Company, for the transfer of the gas undertaking. According to the agreement now signed and sealed, the Directors will continue from the 30th of June next to carry on the concern until the Commissioners acquire the necessary powers, paying to the shareholders a dividend of ten per cent., free of income-tax, and £6 per share in satisfaction of arrears of dividends. Then it is agreed that the shareholders shall receive for every £50 share, debenture stock of the nominal value of £150, on which stock the Commissioners guarantee interest at the rate of four per cent. per annum, free of income-tax. These are the most important stipulations, but there are others to which we may have occasion to refer when we come presently to notice the Provisional Order which the Company have now before the Board of Trade.

The Corporation of Hull are not making progress with their negotiations for the purchase of the gas-works supplying their limits. To an application from the Town-Clerk, the Secretary of the Kingston-upon-Hull Company politely replies that his Directors are not disposed to part with the undertaking; whereupon the Town-Clerk, on his own responsibility, threatens the Company with a Bill to effect a compulsory purchase next session. At menaces of this kind the Company can well afford to laugh. Compulsory purchases are not now favoured by Parliament—they never have been, in fact—and the Corporation of Hull would have no chance of success with any one of the Companies within their limits. They have invited the British Company to contract for the supply of the public lamps in the old town, they (the Corporation) proposing to obtain a Provisional Order to secure the necessary powers. We shall be surprised if the British Company for a moment entertain the proposal.

Water and Sanitary Notes.

The Kent Water-Works Company have issued the statutory notice to the Metropolitan Board of Works, that they intend, on certain dates within the next twelve months, to place five additional districts, within their limits, under a constant supply. The efforts made by this Company, to carry out expeditiously the provisions of the Act of 1871, are, to our mind, highly commendable; but, unfortunately, they do not meet with the approval of the Metropolitan Board. Anxious as that body appeared to be, and, no doubt were, to obtain for London the benefit of a constant supply, they have lent no assistance to, but have rather obstructed, the two Water Companies who are doing their utmost to confer the blessing. In their annual report, just issued, they seem to complain of the conduct of the Kent Company in fixing hydrants, and compelling the Board to pay for them. The fact is that the Board are desirous of getting the water supply into their own hands. They insist that hydrants will be of no value so long as the supply remains in the hands of the Companies. "The water supply," they say, "is not in the hands of the "Local Authorities; the pressure is by no means so great or so "certain [as in Manchester and Liverpool], being derived, not "from gravitation from a high source of supply, but, generally "speaking, from being forced through the pipes by pumping." This is quite true; but what can the Companies do? What would be said if they went to Parliament for power to construct a large reservoir on every height around London? But this, it seems, is what the Board would do if they got the supply into their hands. We need not speculate as to what this would cost the Metropolis, nor inquire what advantages would be gained by an excessively high pressure service. We might have hydrants from which a jet of water could be thrown as high as the fountain at Chatsworth; but what would be the good of them? The great recommendation of a hydrant is, that it can be seen, and is constantly charged with water. The firemen have not to lose time in searching for a plug concealed by mud in the roadway, nor to wait for the turncock, who has to look for a valve similarly circumstanced. Water can be obtained from a hydrant in less than a minute, and this consideration alone should have induced the Metropolitan Board to place them wherever there is a water-main constantly charged.

The boring at Messrs. Meux's brewery has passed through a thin stratum of lower greensand, and entered the Palæozoic rocks, and the expected inexhaustible supply of water has not been discovered. This is, on many grounds, to be regretted, but we were prepared for the disappointment. Mr. Prestwich had expressed his opinion that the greater formation of sandstone would be found south of the river, and the truth of this opinion is now being tested by the boring at Crossness. The bore there is now in red clay, which sometimes overlies the lower greensand. We shall wait with much interest for the result of this experiment, in which we hope the Metropolitan Board will persevere. No one will reproach them for the money spent in the enterprise, even if it should in the end prove abortive. In the meantime it is suggested that the boring at Tottenham Court Road should be continued in that hopeful search for coal under the Metropolis. As a scientific fact, it would be interesting to know that coal exists at a depth of two or three thousand feet under London, but it would remain simply an interesting fact for centuries. While coal sufficient, it is said, for two hundred years, is to be easily won within a short distance of the Metropolis, this generation need not trouble itself about what lies half or three-quarters of a mile below us.

The Corporation of Glasgow appear to be setting resolutely to work to stop the enormous waste of water which goes on in their city. They have now dropped upon defective fittings, by which, of course, the greatest waste is caused. They have an Act which gives them the most ample control, but it seems

to have partly fallen into abeyance. It is now, however, to be revived and strenuously enforced. Cheap taps which eternally dribble will henceforth be rejected in Glasgow, as they would be in London, if the Metropolitan Board owned the water-works.

When we say that the discovery of Professor Barff* is not new, we do not in the least intend to detract from his merits as an original inventor and observer. He has rediscovered the fact that, when iron is exposed to the action of steam at a high temperature, it becomes coated with a continuous adherent layer of magnetic oxide, which absolutely resists the action of moisture, and practically renders iron indestructible. The fact is of great importance to Water Companies, and also to Gas Companies, who suffer much from the decay of pipes in moist ground. We know nothing of the cost of the process, but we imagine it can add very little to the expense of pipes.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CXXXVI.

SUBWAYS.

Although subways are intended for, and do actually accommodate, not only the gas-pipes of a city, but also the water-pipes, telegraph and other tubes, and therefore cannot be considered as a special adjunct of gas supply only, yet a treatise of this character could not, in these days, be considered complete without containing a detailed description of these subways, underground passages, or tunnels, that are, we believe, destined, sooner or later, to be constructed beneath the busy thoroughfares of all populous cities.

Subways were an institution of ancient Rome, and such portions of them as remain to the present day are not the least interesting and important of the many surviving monuments of the enterprise and genius of the people of that empire in bygone times.

The subways of Rome, however—amongst which the Cloaca Maxima, or great water-way, "through which a waggon loaded with hay might pass," was the principal—differ from the subways (properly so called) of London of the present day. The former were vast aqueducts to convey all the waters of the city, pure and foul, into the Tiber, and bore a resemblance to the large sewers of London and Paris of modern times; whereas the subways proper, are dry tunnels, constructed for the reception of the various water, gas, telegraph, and other pipes and tubes permeating the streets in all directions.

Surprise is sometimes expressed that the obvious advantages accruing from the use of subways in London and other great cities for the purposes mentioned, should only have been recognized of recent years. The wonder, however, is misplaced. It is only of comparatively recent years that the necessity for subways for the reception of pipes has arisen.

Although water-pipes have been in use for many years, their dimensions were, until recently, but small, and the number of them not great. The traffic, also, in the streets, even of the Metropolis, prior to the beginning of the present century, gave little indication of reaching the enormous magnitude it has since assumed; and the materials composing the streets themselves were not generally such as, in the breaking or opening of them up, to entail anything like the present heavy expense and difficulty of reinstatement.

It will be interesting to our readers, and not out of place here, in dealing with the subject of subways, if we briefly relate when main-pipes for the conveyance of water were first used in the Metropolis, and the circumstances that led to their introduction.

The first instance on record of water being conveyed to the City of London by means of pipes is in the year 1236. Before this time, according to Maitland, the city and places adjacent were supplied by the "river of wells," in the west part; whose decay was owing to certain mills erected on the banks thereof by the Knights of St. John, which obstructed its navigation, and by degrees gave it the name of Turnmill Brook, a name which is still preserved in Turnmill Street, through part of which this water took its course towards the bottom of Holborn Hill, and thence into the Thames between the Fleet and St. Bride's. In process of time, Turnmill Brook was lost in the name of Fleet Ditch, or Fleet Dyke.

The other waters were Olborn or Holborn, Wall Brook, and Langbourn. Besides these bourns or brooks were several springs which supplied the City, as Holywell, a fine spring famed for its miraculous virtues in superstitious times; Clerk's or Clerkenwell, Skinner's Well, Fogg's Well, Tod's Well, Loder's Well, Crowder's Well, and Rad-Well, and the Horsepool or Horsepond in Smithfield. These several springs, or most of them, united their streams, and formed the "river of wells" before mentioned.

In the year 1236, in consequence of a great want of water prevailing in London, occasioned principally by the encroachment of buildings and the mills of the Knights of St. John, before referred to, on the fresh-water canals about the outskirts of the City, many opulent citizens contributed liberally to the inauguration of a scheme for bringing water by means of main-pipes from six fountains in the neighbouring town of Tyburn, and this project was eventually carried into execution.

Conduits for the reception of this water were accordingly erected in various parts, the first of which was built in the year 1285, at the west end of Cheapside, then called West Cheap, and these were found so convenient, that they were shortly increased to nineteen in number, being supplied with water by pipes from the different wells or fountains in the neighbouring districts. The method of conveying water from the Thames and New River rendered these constructions useless, and they were totally removed after doing good service for many years. Though named conduits, they were, in reality, reservoirs or cisterns of stone, lined with lead.

Stowe informs us that when the conduits were in use, it was customary for the Lord Mayor, Aldermen, and other principal citizens, to repair on horseback annually, on the 18th of September, to the heads from whence they were supplied, "but particularly on the 18th of September, 1562, the Lord Mayor Harper, Aldermen, and many worshipful persons, and divers masters and wardens of the twelve companies, rid to the conduits' head, for to see them after the old custom. And afore dinner they hunted the hare and killed her, and hence to dinner at the head of the conduit. There was a good number entertained with good cheer by the chamberlain; and after dinner they went to hunting the fox. There was a great cry for a mile, and at length the hounds killed him at the end of St. Giles's. Great hallowing at his death, and blowing of horns, and thence the Lord Mayor, with all his company, rode through London, to his place in Lombard Street."

In this way the water supply of London was obtained, with the exception of a portion pumped from the river Thames by Peter Morrys, an ingenious Dutchman, until the time of Hugh Myddelton, a worthy and enterprising citizen, carrying on the business of a goldsmith, who, after several others had attempted it without success, put into execution the design of supplying London with water for domestic use, by means of a river cut through the country from Chadwell and Amwell, near Ware, in Hertfordshire, to a basin or reservoir near Islington, on the north side of London.

This work was begun on Feb. 20, 1608, "and with great difficulty, art, and industry, and a prodigious expense," with the assistance of King James I., was completed, and the water let into it, on Michaelmas-day, 1613; when Sir Thomas Myddelton, Lord Mayor elect, and brother to the author of the scheme, accompanied by Sir John Swinnerton, Lord Mayor, the Aldermen, the Recorder, and many other citizens and gentlemen, repaired to the place called New River Head, in solemn cavalcade. On their arrival, sixty labourers, handsomely dressed and wearing green caps, marched with pickaxes, shovels, and spades, thrice round the basin, preceded by drummers and trumpeters discoursing loud music, and stopping before the Mayor and the others, seated upon an eminence, one of them addressed the assembled company in a copy of verses:—

> "Long have we labor'd, long desired, and pray'd
> For this great work's perfection, and by th' ayd
> Of heaven, and good men's wishes, 'tis at length
> Happily conquer'd, by cost, art, and strength,
> And after five years deare expense in dayes,
> Travaile, and payne, besyde the infinite wayes,
> Of malice, envy, false suggestions,
> Able to daunt the spirits of mighty ones
> In wealth and courage. This, a work so rare,
> Onely by one man's industry, cost, and care,
> Is brought to blest effect, so much withstood,
> His only ayme the cities general good."

This recital being ended, the sluices were opened, and the stream gushed plentifully into the canal, under the sound of drums and trumpets, the discharge of cannon, and the loud acclamations of the spectators.

The source of the New River is twenty miles from London, but the measurement of the original stream, followed throughout its devious windings, necessary to preserve its level, and to some extent, also, owing to the stubborn opposition of certain of the landed proprietors, was 48 miles, 3 quarters, and 16 poles. Its length has been reduced, at different times, to about 28 miles, by cutting off the loops.

On the completion of the work, Mr. Middleton was knighted, and afterwards created a baronet. The stupendous undertaking eventually produced immense profits to the fortunate proprietors of its shares, but the original projector was all but ruined by the expenses he incurred in carrying it to a conclusion.

The successful completion of the New River marked an era in the history of the science of engineering in this country, and the abundant supply of one of the chief necessaries of life, which it afforded to the population of the Metropolis, led to the development of the method of conveying water by means of pipes to the doors and into the dwellings of the inhabitants.

The main-pipes used at that early day were sheet lead, turned on a mandril and soldered at the edges, and the trunks of elm trees, bored with augers, and left in their natural undressed condition outside.

Other water companies were established in the course of time, till at the present day there are eight of these supplying the Metropolis from various sources.

Gas, as we have seen, began to be supplied through pipes in 1807, and telegraph-pipes and the pneumatic despatch tube are of still more recent introduction.

(To be continued.)

* "The Treatment of Iron for the Prevention of Corrosion." By Professor Barff, M.A., &c., &c.

NEATH CORPORATION GAS-WORKS.—The Neath Town Council decided, at their meeting on Tuesday last, to expend the sum of £10,000 in the construction of new gas-works at Millands. The engineering part of the undertaking was given by tender to Willey and Company, of Exeter, for £4480. Mr. John Thomas, of Neath, obtained the contract for masonry and excavating for £4090. The council decided to give Mr. Ellery, the gas manager, £200 for superintending the erection of the works.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

STILL'S REGISTERED GAS-PURIFIER.

SIR,—I have this week had my attention called, for the first time, to a letter which appeared in your JOURNAL of the 12th of December last, in which "G. I. P." gives a sectional view of "Still's Registered Gas-Purifier" from the *Mechanics Magazine* for June 17, 1848, and states that it is in most respects similar to the scrubber recently patented by me, which, he writes, proves the familiar adage, that "there is nothing new under the sun."

Will you permit me to state that at the time the above letter appeared I was distant a thousand miles from England; had I been at home I would at once have written, as I do now, that I knew of, and had seen, years ago, Still's scrubber, that I consider it was an advance of things for the purpose in 1848, but that in no way in which I can view it does it resemble my machine, nor is it possible to make it effective as we now require those things to be.

I feel that I should not make your JOURNAL a medium for crying down one machine and up another; therefore I will abstain from making those comparisons which, in my opinion, prove the two things totally dissimilar; but as my long silence may be mistaken for consent to the views of "G. I. P.," and that, consequently, I have been knowingly appropriating the design of another man, I trust to your permitting me to make this explanation in an early number of the JOURNAL.

35A, *Great George Street, May* 15, 1877. GEORGE ANDERSON.

SALE OF THE BLACKBURN GAS-WORKS.

SIR,—The long-continued negotiations for the transfer of the ownership of this undertaking, from the hands of those by whose public spirit, courage, and enterprise it has been created, to the ratepayers, for whom it will, in future, be conducted by officers responsible to the corporation, have at last been brought to a conclusion upon terms satisfactory to both parties.

I send you a report,* as given in a local newspaper, of a meeting of the Town Council, at which the agreement for the purchase was confirmed, and invite the attention of your readers to it, as a favourable and very satisfactory specimen of the way in which such changes should be effected.

In this instance there has been no attempt on the part of anybody to depreciate the value of the property with the view of lessening the price to be paid. The tone and spirit throughout has been good-natured, sound, and healthy, and I would fain hope that the example will be borne in mind, and serve as a model for proceedings in future cases of the kind.

The works will long endure, as evidence of the sound sense which prevailed among the directors of the company, for whom they were erected, and of the skill and judgment of their engineer and manager, Mr. Ogden, in regard to the arrangement and adaptability of the several parts making up the harmony of the whole, which it will always be a pleasure to see.

21, *Parliament Street, Westminster, S.W., May* 19, 1877. R. P. SPICE.

A SUGGESTION TO THE DIRECTORS OF GAS COMPANIES.

SIR,—I presume that the advantages which result, not only to the individuals immediately concerned, but to the world at large, from the proceedings of associations and societies, in connexion with the various branches of science, engineering, and manufacture, are so fully realized by every intelligent and thoughtful individual of mature age in this country, that I need use no argument in advocacy or in vindication of such associations. They are, in fact, a necessity in this age of mental activity and progress, and by their agency many a valuable discovery, many a valuable experience, many a fact, many a conviction, has been brought to light, while many an error or false theory has been exploded.

Valuable as are the published transactions of such societies, there can be no question that those members who actually attend the meetings, hear the papers read, and also hear, and, it may be, take part in the after-discussion, reap the greater benefit; for no reports of discussions can produce so vivid an impression on the mind as verbal and spontaneous expression, any more than reported evidence can, on all occasions, convey its full value and weight. Besides the fact just stated, there is another well worth regarding; it is that, by intercommunication among members in friendly conversation, after the formal meeting, many doubtful points are cleared up, and much information mutually furnished.

If such be, as they are, the advantages arising from personal attendance at the meetings of most societies, I feel assured that they are specially great in respect to the meetings of gas managers associations, which have broken down the antiquated notions which caused gas-makers in the past to be reticent in respect to constructive details, as well as in respect to the processes pursued in the production of gas, &c. Of all those in existence, the largest and most important undoubtedly is the British Association of Gas Managers, and of that Association I am most decidedly of opinion that every gas manager in the United Kingdom should be a member, and not only so, but that, when practicable, each manager should attend its meetings, as I am sure that, by so doing, he may obtain from, and probably give to, his brethren information which would be of practical value to companies and to the public. It is impossible to estimate the money saving in capital expenditure and in working expenses which have been effected by knowledge gained at these meetings; but I have no hesitation in saying that the saving must be enormous, and that very many companies, as well as thousands of the public, are now reaping a large crop of profit from the seed sown by the agency of the Association.

It unfortunately happens that attendance at the meetings necessitates expenditure of money for railway fares and other matters, and I fear that there are many managers who stay at home because financial considerations restrain them. Such must be the case with many who have charge of comparatively small works.

Now, as the actual and absolute object of the meetings is to extend knowledge, to improve the character of the plant used, to improve the processes of manufacture, distribution, &c.—in short, to promote the interests of gas companies, and, through them, the interests of the public generally, it seems to me that directors should regard the membership and attendance of their managers as a necessity; but, in order not to impose a tax on the resources of the manager, should, when such course is agreeable to him, gracefully present him with the needful sum, and send him, in a certain sense, as their representative, thereby marking their sense of the value of the Association, and evincing their own desire to keep up with the march of improvement. The course suggested has been already adopted by many directors, and I have no doubt that many more, if not most, only require their attention drawn to the matter in order to follow the same path.

I have ventured to write this letter in consequence of having had conversations with a number of gas proprietors at various times, very nearly all of whom were in favour of a presentation being made to the manager, to cover the expenses of his attendance at the Association meetings, and they were quite satisfied, as I am, that if this were done in such a way as to make it an evidence of respect and consideration for the manager, a good service would be rendered to the company by whom he might be employed.

The next meeting of the British Association of Gas Managers is to be held at Bristol, on the 12th of the coming month of June, and I trust that, at that meeting, many a manager will be in attendance, at the instigation, and by the aid of his directors.

55, *Millbank Street, May* 15, 1877. F. W. HARTLEY.

AITKEN AND YOUNG'S PROCESS OF GAS MANUFACTURE.

SIR,—In your notice of this invention in last week's JOURNAL, you have done me the honour of mentioning my name in connexion with the subject; but while I thank you for the meed of praise thus accorded, I must complain of your diminishing its value by the intimation of my having failed "from attempting too much," and I am sure you will, with your usual courtesy, allow me to state my own case.

I attempted to solve the difficulty of decomposing steam, on a manufacturing scale, and converting it into a useful gas, in such a way as to render it not only convenient to the gas manufacturer, but at such a cost as to make it a commercial success, and entirely succeeded; and, on my system, the production of hydrogen and carbonic oxide gas, containing 4 per cent. of carbonic acid, is within the reach of everybody.

This is the great point gained; and, as to rendering this gas luminiferous, it may be done in a variety of ways, and by any kind of oil, whether from shales, or the wells of Petrolia, or similar products which may be found in any region on the face of the earth.

I do not admit *failure;* indeed, I do not believe in the word, and did not cease from my laborious researches for the solution of all the problems involved, until I had overcome all the difficulties as they cropped up.

The active pursuit of the duties of my profession has hitherto prevented my taking any steps to introduce the process to gas companies, and has, indeed, obliged me to defer attending to two applications for its introduction into two gas-works abroad; but let another coal famine come, and gas companies at home will soon make themselves acquainted with the value of the invention.

I have not had time to make myself acquainted with Messrs. Aitken and Young's process; but from your notice of it I imagine that theirs and my own are not distantly related, and that a closer bond of union may be established advantageously.

21, *Parliament Street, Westminster, S.W., May* 19, 1877. R. P. SPICE.

Legal Intelligence.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

WEDNESDAY, MAY 9.

(*Before the* MASTER OF THE ROLLS, *and Lords Justices* JAMES *and* BAGGALLAY.)

In re THE NEW GAS COMPANY.

This was a shareholders petition to wind up the company. Vice-Chancellor Bacon dismissed the petition. The petitioner appealed.

Mr. KAY, Q.C., Sir H. JACKSON, Q.C., and Mr. W. LATHAM were for the appellant; Mr. HEMMING, Q.C., and Mr. MACNAGHTEN WOODS for the company; Mr. GROSVENOR WOODS appeared for some creditors who opposed the petition.

Their LORDSHIPS dismissed the appeal, with costs, including one set of costs for the creditors who appeared. The creditors were not, however, to have their costs of the hearing before the Vice-Chancellor, inasmuch as they had not appealed from his refusal to allow them their costs.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

MONDAY, MAY 7, AND TUESDAY, MAY 8.

(*Before Vice-Chancellor* MALINS.)

BEALE *v.* GWYNNE.

This was an action in which the plaintiff, a civil engineer, who for 45 years had, in conjunction with his brother, carried on business at East Greenwich, sought to obtain, under the construction of an agreement entered into between him and Messrs. Gwynne, engineers, of Essex Street, Strand, certain royalties or profits on oil-pumps in connexion with gas-exhausting machinery they might supply to gas companies and gas-works.

Mr. LOCOCK WEBB, Q.C. (with whom was Mr. CHADWICK HEALY), on behalf of the plaintiff, said the business which he had carried on with his brother consisted mainly in the manufacture of certain machinery connected with gas-works, and he had, in fact, obtained some celebrity, even beyond England, for the excellence of his manufacture. After his brother's death some nine years ago, the plaintiff had, for a short time, continued to carry on the business. The defendant's business had been, at all events before he entered into the agreement with the plaintiff, that of a hydraulic engineer; and the short history of the case was that Mr. Beale applied to the defendant in December, 1869, to know whether he was prepared to undertake the manufacture of machinery such as his brother had made under his superintendence; that led to an interview and an agreement between the parties. Letters had passed between them previously, which it would be necessary to read to show exactly the position of the matter.

* See page 784.

Mr. GLASSE, Q.C. (with whom was Mr. PHEAR), for the defendant, said time might be saved by stating that the matter had already come before the Court in February, 1876, when his lordship settled two issues for trial, excluding all these letters. The fact was the plaintiff had got into such a muddle with his voluminous statement of claim and enormous reply, that he hardly knew what to go upon.

The VICE-CHANCELLOR read the issues, as follows:—"Whether the defendant has ever, and, if ever, when and under what circumstances, refused or neglected to buy from the plaintiff the oil-pumps named in the agreement of Jan. 1, 1872; secondly, whether the defendant ever, and, if ever, when and under what circumstances, made default in rendering to the plaintiff proper accounts showing the moneys payable to him, or in rendering proper information in reference to such accounts."

Mr. WEBB, resuming, said that one particular piece of machinery made by the plaintiff was called a gas-exhauster, which was not complete unless it had attached to it an oil-pump—a beautiful little piece of mechanism, so fitted as to constantly lubricate the exhauster in working, and save the expense of employing men to continually oil the machinery. It was, in fact, a necessary adjunct to the machinery which the defendant was to make. That statement would better convey to the Court the full meaning of the important article of the agreement, the fourth, on which one of the principal contests in the case arose, and that question, in fact, was whether the defendant was obliged to buy the oil-pumps required for his gas machinery from the plaintiff, or whether he was at liberty either to obtain them elsewhere or make them himself; the plaintiff contending he was bound to take them from him. Having previously been a hydraulic engineer, when he entered into agreement with Mr. Beale, defendant commenced to make gas machinery also, under that gentleman's superintendence, and in some of the exhausters as many as four or five oil-pumps or lubricators were fixed. Consequently, it was an important part of the case to show that the oil-pump was a necessary part of the machinery. [A brass model was produced to the Court.]

Mr. GLASSE pointed out that it was nothing more than an adaptation of the familiar salmon-wheel, with which those acquainted with fly-rods were familiar.

The VICE-CHANCELLOR, having examined the pleadings, said that the dispute ought certainly to be settled.

Mr. WEBB said that the defendant was liable to pay commission to the plaintiff had been fully admitted, as he had, in fact, offered to compromise by paying him 20 per cent. of the profits on the gas-exhausting machinery he supplied to gas-works. That offer had, of course, been declined.

Mr. *Beale*, the plaintiff, was then called to prove formally the negotiations which had resulted in the agreement, under one of the provisions of which he was to have 3½ per cent. on the nett price received by the defendant for gas-exhausters, steam-engines, boilers, and bye-passes supplied by him to gas companies and gas-works. A previous agreement had been made between them (dated Jan. 20, 1870), by which defendant was to pay 10 per cent. upon exhausters, 5 per cent. upon other classes of machinery, and a different per centage on another class, and it had been replaced by the agreement of 1872, under which witness was to be paid 3½ per cent. on all machinery included in the agreement of 1870.

Mr. *Allen* (Messrs. Gwynne's manager) was then called to prove that the agreement was confined simply to the gas exhausters supplied directly by the defendant to gas companies and gas-works.

During the examination and cross-examination of the witness on the transactions of the firm, several attempts were made, at the instance of the Vice-Chancellor, to settle the case.

Mr. GLASSE said all defendant asked was to be allowed to buy the oil-pumps where he pleased. There never had been a patent, and as plaintiff had no special right in them he was receiving a very good offer in the proposal to pay him 20 per cent.

The VICE-CHANCELLOR said perhaps at another time the parties would conquer their repugnance to employ solicitors in drawing such an agreement. He could see that if they would only settle the matter, the result would be, having told the world (which might very well be the case) that Mr. Beale was the most skilful oil-pump maker known, they would still avail themselves of his skill, and although nominally at liberty to go elsewhere, they really would not.

Mr. WEBB offered to divide the profit on this machinery half and half.

Mr. GLASSE said defendant must have the opportunity of ascertaining the current market prices. He could not allow the plaintiff's nominees to name any price they pleased; they might fix £5 for these articles, or any other ridiculous sum, at which the defendant would be obliged to take them.

Mr. WEBB said the prices charged to Mr. Beale himself were 31s. 6d. and 21s. for the horizontal and vertical apparatus respectively.

Mr. GLASSE said the fact was contracts had already been lost by defendant, on account of the plaintiff having put too high a price upon them. He would offer to pay 20 per cent. on any amount the defendant might be able to buy them at, and no more.

Mr. WEBB said defendant charged, as appeared by his own books, £2 1s. 9d. for vertical pumps.

Witness (Mr. Allen) said that was not the case. They charged 25s. for the vertical, and 35s. for the horizontal pumps.

The VICE-CHANCELLOR suggested that as between plaintiff and defendant the prices should be taken at 20s. and 30s.

Mr. GLASSE refused.

The VICE-CHANCELLOR hen said that, instead of going into these questions of detail, the parties should at once take the opinion of the Court on the construction of the agreement.

Mr. *Gwynne* (the defendant) was called, and stated that the clause in the agreement, providing for the payment to the plaintiff of 3½ per cent. on the items of machinery mentioned, had been expressly agreed between them to be confined to those items, as being connected with exhausting machinery supplied to gas companies and gas-works. He had considerable business before he heard of plaintiff, principally in hydraulic machinery, machinery for artesian wells, and so on, besides apparatus for gas-works. It was distinctly understood by plaintiff that he was not to have a commission on any exhausters which were not supplied directly to gas-works or gas companies. In fact, in their negotiations, he said that was all he wanted, as his connexion lay altogether with gas-works.

Cross-examined by Mr. WEBB: Had supplied machinery for the use of gas-works before his connexion with plaintiff, but since he had known that gentleman he had supplied gas machinery to the extent of upwards of £50,000. He had indeed devoted much time and attention to the subject. An agreement had no doubt been come to in 1870 with regard to the commissions to be payable to plaintiff; but the agreement of 1872, the construction of which was now in question, was not come to with the view of fixing one uniform commission on all machinery. Their first disagreement occurred in consequence of plaintiff threatening to make application to the gas companies and other customers to whom machinery had been supplied for the purpose of ascertaining the state of his accounts with them, and the prices at which the articles were supplied. This appeared so shocking a thing, conveying, as it did, an imputation upon him, that he felt he could not for a moment longer submit to the plaintiff's proceedings.

Mr. GLASSE then addressed the Court on behalf of the defendant, and said that the plaintiff's contention which he had to meet was that the article of agreement, providing for the payment of the commission, extended to every description of machinery supplied to gas-works, whether connected with exhausters or not—a contention which was nothing less than absurd. Would he maintain that, if defendant supplied machinery for sinking an artesian well on the premises of a gas company, he would be entitled to commission on that? Simply stated, the result of the action had been to show that he had no ground whatever for his contention; he had received considerable sums, and if the operation of the agreement was to be confined to the exhausting machinery, he had been overpaid. If it was not, but was allowed to extend to all machinery supplied by defendant to gas-works, more would be due to him on the accounts.

The VICE-CHANCELLOR, without calling for a reply, said he was sorry that so much time had been occupied in such a case. It appeared that the plaintiff had been engaged for many years by his brother at East Greenwich, who had acquired great reputation as a manufacturer of engineering apparatus; and that the defendant, who had made a speciality of supplying gas companies with exhausting apparatus, conceived it worth his while to have plaintiff associated with him, as well for his knowledge as his name. He, therefore, entered into a contract with him, in 1872, by which he was to receive 3½ per cent. upon all exhausting machinery supplied to gas companies. He (the Vice-Chancellor) was of opinion that the plaintiff had made out his title to this commission; but it would not be paid on machinery *bonâ fide* sold to a purchaser, although it might afterwards reach a gas company. But if it were supplied with the knowledge of the defendant that it was for a gas company, the plaintiff was entitled to his commission. He, therefore, directed an account to be taken upon that footing. The defendant to pay the costs.

THURSDAY, MAY 17.

SIMMONS *v.* THE VESTRY OF RICHMOND.

Mr. PEARSON, Q.C., said he moved, on behalf of the plaintiff, for an injunction to restrain the defendants working a steam-engine and pumps erected by them near Monmouth House, Lower Road, Richmond, in the occupation of the plaintiff, in such a manner as to occasion a nuisance, disturbance, or annoyance to the plaintiff, or any other persons residing in the house, and from causing to be thereon or deposited on the plaintiff's premises any cinders, ashes, or dust, from the steam-engine, or otherwise. The plaintiff was the occupier of Monmouth House, a large house containing 35 rooms, which she had rented in order that she might take in ladies and gentlemen to board. She had a large connexion, and was, of course, desirous to keep that connexion. The vestry, who wished to supply Richmond with water, having, in spite of his (Mr. Pearson's) efforts in that Court, got rid of the Southwark Company, had put up an enormous engine within 30 feet of the plaintiff's house, with a large boiler, and a steam funnel 18 feet, and a Blake's steam-pump, making 60 double strokes a minute. This was going on Sundays as well as week days; it filled the house with smoke, and made the place vibrate.

The VICE-CHANCELLOR asked if this was part of the temporary or the permanent works.

Mr. GLASSE (who appeared for the vestry): The temporary works.

The VICE-CHANCELLOR: How long will it last?

Mr. GLASSE: It ends next month. Besides, plaintiff is 60 feet off, and people living within 15 feet do not complain. It is the greatest farce out.

The VICE-CHANCELLOR: It is important whether it is a temporary or a permanent work.

Mr. GLASSE: The contract for the artesian well will be completed on the 30th of June. Nobody, except those under the influence of the Southwark Company, of which the plaintiff is one, makes any objection.

In reply to the VICE-CHANCELLOR, Mr. GLASSE said the engine was used for pumping water to the top of the hill. None of the residents in the other houses near the works complained.

Mr. PEARSON: Because they are all occupied by vestrymen. This, he added, was to go on until the mythical artesian well was sunk and was successful. He wanted to know how long that would be. The plaintiff swore positively in her affidavit that it was a loss to her of something like £30 a week. It was a most serious matter to her, especially as the season was just coming on. She had already received notice from two persons.

Mr. GLASSE said there had been many affidavits filed which there was no time to answer. The Vestry were using the engines on a piece of land, the lease of which expired on the 30th of June. They had been working since the 1st of January, and they had never been complained of till now. If they were stopped, the supply to Richmond Hill would cease. He had a right to answer the affidavits.

Mr. SENIOR (the vestry-clerk) pointed out the position of the works on a plan. The pumps were on the opposite side of the road, but the engine was the same side as the plaintiff's house, the skating rink intervening.

The VICE-CHANCELLOR said the Vestry were entitled to have time to answer the affidavits, and he would adjourn the further hearing of the application till next motion day.

QUEEN'S BENCH DIVISION.

THURSDAY, MAY 17.

(*Before Justices* MELLOR *and* FIELD.)

REGINA *v.* THE COLNE VALLEY GAS COMPANY.

In this case a rule *nisi* was obtained on the 17th ult. for a new trial, and Mr. DIGBY SEYMOUR, Q.C., and Mr. CAVE, Q.C., now showed cause against it.

This was an indictment for the obstruction of a highway, and was tried before Lord Coleridge at the last Spring Assizes at Leeds, when it appeared that the defendants, who are a gas company in Yorkshire, had on two or three occasions dug trenches across a highway, near Huddersfield, for the purpose of laying down or repairing their mains. The highway in question was 8 yards wide, and it was proved that on one occasion they had dug trenches in three places, two of which were across the highway, and the third parallel to it. The trenches were 3 yards long, and were opened at night and closed at three in the morning. On another occasion some more trenches were dug, so that it was impossible to drive past along the highway, and these were kept open from eleven at night until two o'clock in the following afternoon. The case of *Regina v. The Longton Gas Company* was cited at the trial, the circumstances of which were very similar to those of the present case, and where eminent judges had held that the defendants had been properly convicted. Lord Coleridge, in summing up, directed the jury that if they thought the facts were proved they should pronounce a verdict of guilty, and he afterwards added that having told them the proper verdict to find—indeed, the only verdict they could find—on the authority of the case which had been cited, which bound them as much as it bound him, they must tell him whether they thought there was a sensible and appreciable obstruction of the highway. The jury at once found that there was, and returned a verdict of guilty.

Justice FIELD asked on what grounds the rule had been granted.

Mr. WILLS, Q.C., who supported the rule, said on the ground of misdirection. Whilst the judge stated he would leave the points raised to the jury, yet in reality he left them no liberty in the matter, and they found a verdict of guilty.

Mr. SEYMOUR contended that whilst every one could use the public roads to a certain extent, no one could legally cause such an obstruction as to be a nuisance. The learned judge had adopted the only course open to him. The indictment charged the defendants with digging several trenches across the road at Milnsbridge, near Huddersfield, to the obstruction of the public thoroughfare. The trenches were about 3 yards long and half a yard in depth, and in such a way as to prevent vehicles from passing. A funeral was actually so obstructed, and the decent burial of the dead interfered with.

Mr. CAVE followed on the same side, and maintained that Lord Coleridge had left the matter to the jury properly and fairly, being controlled to a certain extent by former decisions. He said, in his summing up, if the facts laid before the jury were true, he should, as a matter of fact, direct a verdict of guilty, assuming that the acts complained of were committed by the defendant company.

Justice FIELD: Had I been on the jury I would have found a verdict against the defendant company at once. The only question is, whether it was proper for the judge to have directed the jury in the finding of their verdict.

Mr. CAVE, in concluding his argument, said the question to be decided was one of the very highest importance. Upon the decision would depend the existence of one or other of the companies. One or other of them should die; it was impossible for them to live together. This being a criminal case, the question was entirely one for the jury. The surrounding observations, therefore, amounted to misdirection, and the verdict should be set aside.

Mr. WILLS, in supporting the rule, observed that not only was the case important to the parties, but a most important constitutional principle was at stake—namely, that a defendant cannot be convicted of a criminal offence unless a jury are allowed to use their own judgment in saying whether he is guilty or not. Lord Coleridge had acted improperly in telling the jury that the case of *Reg. v. Longton* bound them as well as it did him. All the jury had to do was to say whether what the defendants had done was bad enough to render them criminally responsible. In the case of *Reg. v. Morris*, where the defendants were indicted for obstructing the public highway by the erection and maintenance of a private railway, Baron Vaughan left it for the jury to say whether the effect was to obstruct, hinder, or inconvenience the public. Lord Tenterden concurred with this, and the question of obstruction was left to the jury to decide. When addressing the jury for the defendants, he (counsel) asked them to look to the fact that what was done was done in the night time, when no one was about except policemen, and also that the trenches only existed for a short period.

Justice MELLOR agreed that there should be a real obstruction to the public convenience before an indictment would lie.

Mr. WILLS said that although there might have been a sensible and appreciable obstruction of the highway, yet, even admitting that, he would contend there was no nuisance, and upon that question alone the jury had to decide. The jury were not lawyers, they could not understand what was even a difficult matter for experts, and, listening to the latter part of Lord Coleridge's summing up, they could not come to any other conclusion but that they would be violating their oaths if they did not find the defendants guilty.'

The arguments were continued on the following day. At their close,

Justice MELLOR delivered judgment. He said the Court were of opinion, after the most careful consideration, and after reading the whole summing up of the learned judge, that there ought to be a new trial. They thus decided mainly on the ground that from the mode in which the case had been left to the jury, the latter may possibly have misunderstood the case of *Reg. v. The London Gas Company*, which the learned judge had told them bound them and him. When that case was examined, it appeared possible that the jury might have been misled, for the facts in that and in the present case were not the same. The judgment in *Reg. v. The Longton Gas Company* was not grounded upon the facts only, but also upon admissions which were made on both sides. It was not there disputed that the highway was obstructed, but it was contended that the defendants had a right to obstruct as they did. The learned judge told the jury in this case that he should ask them whether they thought that there was a sensible and appreciable obstruction by the defendants in the sense he had explained to them, which he had explained with reference to the Longton case. They thought, indeed, that the whole course of the case showed that the jury were so tied up with the Longton decision, which was not necessarily applicable, that the verdict was not satisfactory, and the rule would, therefore, be made absolute for a new trial.

COMBMARTIN PETTY SESSIONS.—MONDAY, MAY 7.
(*Before Mr.* TOMS, *Chairman, and Messrs.* BASSETT *and* NYE.)

ALLEGED NUISANCE AT THE ILFRACOMBE GAS-WORKS.

At a Special Sessions at Ilfracombe, on the 20th of March, in the case of a summons by the Ilfracombe Local Board against the gas company for causing a nuisance, a decision was arrived at that, unless certain recommendations were adopted, a fine would be inflicted at the May Combmartin Sessions.

A letter was now read from Mr. T. A. Thorne, on behalf of the local board, stating that they had withdrawn the summons, the gas company having completed the improvements at their establishment; and having in other respects complied with the requirements of the local board as to the settlement of the case, the complainants had thought it right to consent to the discontinuance of the proceedings—a course which he trusted the magistrates would not disapprove.

In answer to the BENCH, Mr. FFINCH said Mr. Thorne had seen his clients (the gas company) behind his back, and had informed them that the summons was withdrawn, and the case was, of course, in the hands of the Bench.

The MAGISTRATES concurred with the request of withdrawal.—No application was made as to costs.

CENTRAL CRIMINAL COURT.—WEDNESDAY, MAY 9.
(*Before the* COMMON SERJEANT.)

EMBEZZLEMENT BY THE ASSISTANT SECRETARY OF THE COLNEY HATCH GAS COMPANY.

William Henry Wood, clerk, aged 28, pleaded "Guilty" to embezzling £1100, the money of the Colney Hatch Gas Company, of which he was under-secretary. He was further indicted for obtaining £463 by false pretences from Mr. Robert Higdon, but this case was not proceeded with.

Mr. POLAND prosecuted, and Mr. GRAIN conducted the defence.

The prisoner, who, before his defalcations became known, absconded to New Zealand, was sentenced to five years penal servitude.

AUDLEY GAS-WORKS.—At the last meeting of the Audley Local Board, held on the 2nd inst., plans of the proposed new gas-works at Audley were presented by Mr. Davies, gas engineer, Kidsgrove, together with specifications. These plans were considered by the board as highly satisfactory, and were adopted.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

[Extract from the Annual Report for 1876 of the Metropolitan Board of Works.]

The Board, acting in conjunction with the Corporation of London, laid before Parliament again this year [1876] the Bill for the regulation of the metropolitan gas supply, which was approved by a Select Committee of the House of Commons last year [1875], but which was prevented by the pressure of public business and the late period of the session from passing through the other stages necessary to complete legislative sanction. The Bill provided for placing all the metropolitan gas companies under uniform conditions, and it regulated the price, illuminating power, purity, and pressure of the gas to be supplied. The principal feature of the Bill, and that by which it differed from all preceding gas legislation in the Metropolis, was the provision that the profits to be divided among the shareholders should depend upon and vary inversely with the price at which gas was supplied. The rate of dividend taken as the standard was 10 per cent., hitherto the maximum rate, and the standard or initial price to be charged for gas was fixed at 3s. 9d. per 1000 cubic feet. For every penny per 1000 feet charged in excess of this price, the dividend was to be diminished by a quarter per cent., and conversely, for every penny by which the price was reduced, the company was to be allowed to divide an additional quarter per cent.

The provisions of this Bill, though opposed last year by nearly all the metropolitan gas companies, were adopted by the Commercial Company, and embodied in an Act of Parliament which that company obtained. This year the South Metropolitan Company introduced a Bill, containing substantially the same provisions, and The Gaslight and Coke Company also deposited a Bill by which it was proposed to adopt, with some limitation, the sliding scale of price and dividend; the limitation being that there should be no diminution of dividend unless the price of gas was above 4s. per 1000 feet, and no increase of dividend unless the price fell below 3s. 6d.

At the same time as the Bill of The Gaslight and Coke Company was prepared, a scheme was submitted to the Board of Trade for the amalgamation of the undertakings of the Imperial and Independent Gas Companies with that of The Gaslight and Coke Company, and, in accordance with the requirements of the Act of Parliament, a copy of the scheme was sent to the Board in order that it might express its views on the subject. The question of the expediency of the proposed amalgamation was considered by the Board from the point of view of the consumers, and the conclusion come to was that it would be inexpedient to agree to the amalgamation, unless the companies concerned should consent to be subjected to the conditions which Parliament might think right for the protection of the consumers interests. The Board of Trade having suggested that an arrangement might be come to between the companies and the representatives of the consumers, and thus the expense of another long parliamentary contest avoided, and the companies having expressed their willingness to discuss terms, a conference took place at the office of the Board of Trade, at which this Board, the Corporation of London, and the three companies seeking to amalgamate, were represented. The companies then conditionally agreed to accept all the main provisions of the Metropolis Gas Bill approved by the Select Committee of the House of Commons last year, and the only important question left open was, upon what terms the united company should in future raise such additional capital as might be required. This question, which was not dealt with in the Metropolis Gas Bill, and upon which, therefore, the Board and the Corporation were not at once prepared to express an opinion, was subsequently considered, and the conclusion arrived at, after conference with the Chancellor of the Exchequer and the President of the Board of Trade, was, that the new capital should be raised one-half by the issue of shares, and one-half by borrowing, and that the new shares should be sold by auction, or that tenders for the same should be invited from the public, and the shares allotted to the highest bidders.

This mode of issuing new shares had been lately adopted in the case of several provincial gas companies, and had been found to work satisfactorily. It was considered to be the best for the consumers interests, inasmuch as whatever the new shares might be worth above their nominal value would be received as premium, and applied to the purposes of the company's undertaking, and would not be treated as part of the capital entitled to dividend. The proposal of the Board and the Corporation with respect to the mode of raising capital was accepted by the companies, and it was agreed that this and the other conditions to which the united company was in future to be subject should be incorporated in the special Bill of The Gaslight and Coke Company, and that no opposition should be offered by the Board and the Corporation to the amalgamation of the Imperial and Independent Gas Companies with The Gaslight and Coke Company. The amalgamation was accordingly sanctioned by an Order in Council on March 24 last.

The Gaslight and Coke Company's Bill passed through both Houses of Parliament, and received the Royal Assent on the 11th of August. The amount of new share capital which the Act authorizes the company to create is £1,000,000. This will raise its total stock and share capital to £8,265,000. The Act also gives the company power to borrow £1,000,000 in addition to the loans already existing.

The Bill of the South Metropolitan Gas Company was referred by the House of Commons to a Select Committee, before which the Board appeared by counsel, as did also the local authorities of some of the districts supplied by the company. The provisions of the Bill were in effect the same as those of the Bill of the Board and the Corporation of London, including the sliding scale of price and dividend, with 3s. 9d. per 1000 cubic feet as the standard or initial price, and 16 candles as the illuminating power. The Select Committee, after hearing counsel and evidence, decided that, inasmuch as the company was favourably circumstanced, and was able to supply gas of 14-candle power for 3s. per 1000 cubic feet, the initial price to be charged by it for 16-candle gas should be 3s. 6d. instead of 3s. 9d. The company sought power to raise additional share capital to the amount of £250,000, and in addition to that to borrow £250,000, and, in default of any provision to the contrary, the new shares carrying with them, like the other shares of the company, the right to a standard dividend of 10 per cent., would have been allotted to the existing shareholders, and have been equivalent to the granting to them of a large money premium, as the shares could be sold for nearly double their nominal value. The Board therefore asked that the creation of the new shares should be subject to the same conditions as those agreed upon, with the approval of the Chancellor of the Exchequer and the Board of Trade, for The Gaslight and Coke Company; that is to say, that they should be offered to the public by auction or advertisement, and allotted to the highest bidders, the amount received by way of premiums being applied to the purposes of the undertaking, and not considered as capital entitled to dividend. The Select Committee decided that this course should be adopted, and clauses were inserted in the Bill accordingly. The company also obtained power to amalgamate with any other metropolitan gas company on the south side of the Thames, subject to an Order in Council being obtained in each case.

As the districts supplied by the three companies brought under the operation of the new conditions included the greater part of the Metropolis, the Board of Trade thought it desirable to make an effort to bring the remaining metropolitan gas companies under the same conditions, so that the question might be settled for some time to come. The three companies still regulated by the provisions of the Metropolis Gas Act of 1860, the London, the Phœnix, and the Surrey Consumers Companies, were accordingly communicated with by the Board of Trade, and they, after some negotiation, consented to come in under the conditions applied by Parliament to The Gaslight and Coke Company, provided that certain powers were at the same time given to them which would render it unnecessary for them to apply to Parliament when such additional powers were required. The powers they asked for were—

1. To increase their capital to an extent proportionate to that authorised for The Gaslight and Coke Company.

2. To acquire, by agreement, such additional land as they might hereafter show to the Board of Trade to be necessary for their undertakings.

3. To amalgamate their various undertakings, subject to an Order in Council being obtained in each case.

4. The London and Surrey Consumers Gas Companies further wished to have power to make up their reserve-funds upon the existing terms, until such funds should be brought up to the amounts named in their respective Acts of Parliament; and the Phœnix Gas Company asked to be allowed to issue its debenture stock at a rate of interest not exceeding 5 per cent., instead of 4 per cent. to which it was then limited,

The Board, after some correspondence with the Board of Trade, agreed to these powers being given, with some modifications of detail, and the Board of Trade thereupon prepared and laid before the House of Commons a Bill to give effect to the proposed arrangement. The Bill, which was entitled the Metropolis Gas (Surrey Side) Bill, was read a second time and referred to a Select Committee, of which the Right Hon. W. E. Forster was chairman. The committee after hearing the evidence, asked the parties—that is to say, the Board of Trade, this Board and the gas companies—to consider whether they could agree upon an initial price of 3s. 6d. per 1000 feet for all the companies on the south side of the Thames, instead of 3s. 9d. as proposed in the Bill. The chairman stated that, if this were not agreed to, it would be necessary to enter upon what would be a long inquiry in order to determine what the proper figure for an initial price would be, looking to the fact that a Select Committee earlier in the session, on the South Metropolitan Company's Bill, had decided that 3s. 6d. should be the initial price for that company. The inquiry was adjourned to give the parties time to consider this suggestion, and the gas companies at once decided not to accept it. As the Bill was one agreed upon between the parties, and was intended only to carry out the arrangement made, the refusal of the companies interested to accept a lower initial price than 3s. 9d. practically put an end to the Bill. It was accordingly announced to the Select Committee at its meeting the next day (July 28) that the Board of Trade withdrew the Bill.

The Metropolis Gas Bill, introduced at the beginning of the session by the Metropolitan Board in conjunction with the Corporation of London, was withdrawn after the approval of the separate Bills of The Gaslight and Coke and South Metropolitan Companies, and the introduction of the Bill by the Board of Trade to bring under conditions similar to those in the last-mentioned Bills the other gas companies still governed by the Act of 1860.

The results of the legislation of the years 1875 and 1876, relating to the metropolitan gas supply, may be summarized as follows:—Three companies, the undertaking of one of which is larger than those of all the other metropolitan gas companies together, are now governed by the conditions which the Board and the Corporation of London proposed. These companies and their authorized share capital are as follows:—

The Gaslight and Coke Company	£8,265,000
The Commercial Gas Company	850,000
The South Metropolitan Gas Company . . .	750,000

Three other companies remain subject to the provisions of the Metropolis Gas Act of 1860, under which they are not bound to supply gas of a higher illuminating power than 12 candles, whilst they have the power to charge for the same a price which may rise to 4s. 6d. per 1000 cubic feet, without any right of interference on the part of the local authorities. These three companies and their authorized share capital are as follows:—

The London Gas Company	£875,000
The Phœnix Gas Company	1,044,000
The Surrey Consumers Gas Company	250,000

The Board would have been glad if its original project of bringing all the metropolitan gas companies under uniform regulations could have been carried into effect. Circumstances having prevented this, it will be for the Board, whenever the three last-mentioned companies apply to Parliament for further powers, to ask that they may be placed under such improved regulations in the interest of the consumers as Parliament may consider just.

Testing of Gas.

The Gas Examiners appointed by the Board have, during the past year, tested daily the gas supplied by The Gaslight and Coke and the South Metropolitan Gas Companies, to see that it was of the illuminating power and purity prescribed by the respective Acts of Parliament, and by the Gas Referees. The quality of the gas has been well maintained, so that it has been unnecessary for the Board to proceed against either of the companies for defective illuminating power or purity. On the very few occasions on which there was some slight default, it appeared to be due either to unavoidable circumstances, or to be so exceptional that the Board did not think it right to take any proceedings.

With respect to sulphur compounds other than sulphuretted hydrogen (the presence of the latter in gas being absolutely forbidden) the Gas Referees, on the 1st of April last, again reduced the maximum quantity allowed from 25 to 20 grains in 100 cubic feet for works within the Metropolis, and from 20 to 15 grains for the gas made at Beckton, near Barking, and Bromley-by-Bow. On the 1st of October last, the beginning of the winter half year, the Referees reverted in each case to the higher maximum, the ground for this being that in the winter, when the quantity of gas consumed is much larger than in summer, the companies resources in the matter of purification are more heavily taxed, and it is more difficult to eliminate the sulphur to the same extent.

It is urged by the companies that even the limit of 25 grains in 100 feet of gas is one difficult to be observed, and it is said to be impossible to keep the sulphur down to that amount without using means for its removal which cause a very offensive smell in the neighbourhood of the works. Complaints have been made during the past year, by several of the local authorities, of the offensive smell from the gas-works in their districts, arising from the use of lime to purify the gas from sulphur, and representations have been made to this Board and to the Board of Trade on the subject. The Board of Trade have called upon the Referees to state whether, in their opinion, the present sulphur maximum can be maintained without creating a nuisance, and whether, if they are of opinion that it cannot be so maintained, the maximum should not be increased. In the meantime, The Gaslight and Coke Company have given notice of their intention to introduce a Bill into Parliament next session to repeal the sections of their Act of 1876 which authorize the Referees to prescribe from time to time the maximum amount of impurity to be allowed, and which subject the company to penalties in case of default in this respect. With respect to this proceeding of the company, it may be observed that, whatever may be the decision of the Gas Referees upon the question proposed to them by the Board of Trade, it is evidently quite inadmissible that the company should be relieved altogether of the obligation imposed upon them, in the interests of the public, to supply gas as free from noxious and offentive impurities as it can be made.

The Bill, in its present form, will certainly be opposed by the Board.

Testing of Gas-Meters.

By the Act regulating the measures to be used for the sale of gas, the Board are required to have all gas-meters made for use in the Metropolis tested and stamped by proper officers, so that the public may be assured of the accuracy of the meter in registering the quantity of gas consumed. A small charge is made for each meter tested, according to a scale fixed by the Act. There are three testing-places, two on the north and one on the south side of the Thames, and at each place is an inspector with a staff of assistants. The number of meters tested during the year 1876 was 79,632, and the fees received or receivable in respect thereof amounted to £2797 2s. The expenses of carrying out the provisions of the Act were about £2400.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone during April, supplied by The Gaslight and Coke Company:—

	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon.in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 21 Obser.	High-est.	Low-est.	High-est.	Low-est.	Grains.	Grains.	
Gas supplied from the Fulham works . .	16·41	17·50	15·91	21·72	7·92	15·73	0·36	No trace
Gas supplied from the Beckton and Bow works	16·34	17·31	15·24	32·75	15·87	11·07	0·50	No trace
Cannel gas supplied from the Pimlico works	20·40	21·31	19·02	22·22	11·83	16·38	0·40	No trace

Mean of daily readings of barometer . . . 29·56
,, ,, ,, thermometer . . . 60·42

* Each observation consists of ten readings of the photometer, at intervals of one minute.

The mean illuminating power of the gas supplied during the month from the Fulham works was equal to 16·41 candles, and ranged between 15·91 and 17·50 candles; from the Beckton and Bow works the mean was equal to 16·34 candles, and ranged between 15·24 and 17·31 candles; whilst the cannel gas supplied from the Pimlico works gave a mean light equal to 20·40 candles, and ranged from 19·02 to 21·31 candles. In the Fulham gas a mean quantity of sulphur, amounting to 15·73 grains, was found in 100 cubic feet of gas; in the Beckton gas it was 11·07 grains; and in the cannel gas it was 16·38 grains. The amount of ammonia found did not exceed half a grain. The pressure of all the gases was fair, and on no occasion was sulphuretted hydrogen detected in either of them by the ordinary tests.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following returns of the average daily quantity of water supplied by the London Water Companies during April. According to these, 113,059,770 gallons, or 513,682 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight), were supplied daily; or 212 gallons (96·3 decalitres) rather less than a *ton* by weight, to each house, and 29·9 gallons (13·6 decalitres) to each person, against 30·6 gallons in April, 1876.

Companies.	Number of Houses, &c., supplied in April, 1876.	April, 1877.	Aver. Daily Supply of Water in Gallons* during April, 1876.	April, 1877.
Total supply	525,369	532,166	114,315,996	113,059,770
From Thames	247,328	249,548	59,272,347	57,103,563
,, Lea and other Sources . .	278,041	282,618	55,043,649	55,956,207
Thames.				
Chelsea	28,675	28,741	7,310,500	7,163,300
West Middlesex	47,800	49,035	9,662,837	9,814,214
Southwark and Vauxhall . . .	80,413	77,880	19,465,000	17,250,000
Grand Junction	36,616	37,683	10,541,910	10,815,049
Lambeth	53,824	56,209	12,292,100	12,061,008
Lea and other Sources.				
New River	124,135	125,219	24,963,000	24,368,000
East London	109,375	111,967	23,452,000	24,908,780
Kent	44,531	45,432	6,628,649	6,679,427

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for April, 1877, as compared with that for the corresponding month of 1876, shows an increase of 6797 houses, and a decrease of 1,256,226 gallons of water supplied daily.

Dr. Frankland reports, as the result of his analysis of the waters supplied to the Metropolis and some of its suburbs during April, that, taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the last nine years as unity, the proportional amount in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was—Tottenham 0·5, Colne Valley 0·9, Kent 1·0, New River 3·1, East London 3·6, Lambeth 4·7, West Middlesex 5·3, Grand Junction 5·7, Chelsea 6·1, Southwark 7·9. The Thames was again much polluted with organic matter, and the water delivered from this source was not fit for dietetic purposes. The West Middlesex Company alone delivered this water in an efficiently filtered condition. The Chelsea, Grand Junction, and Lambeth Companies sent out slightly turbid water, whilst that supplied by the Southwark Company was very turbid, repulsive in appearance, and contained fungoid growths and moving organisms. The Grand Junction Company's water also contained moving organisms. The water supplied from the Lea by the New River and East London Companies was of much better quality and was efficiently filtered. The water supplied from artesian wells to the inner circle by the Kent Company, and to the outer circle by the Colne Valley Company and the Tottenham Local Board of Health was wholesome, bright, and palatable, and of most excellent quality for dietetic purposes. The Colne Valley water was also soft and suitable for washing. Seen through a stratum 2 feet deep, the Kent, Colne

Valley, and Tottenham waters were clear and colourless; the New River and East London, clear and nearly colourless; the West Middlesex, clear and slightly yellow; Grand Junction, slightly turbid and brownish yellow; Chelsea, slightly turbid and brownish; Lambeth, slightly turbid and slightly yellow; and the Southwark, very turbid and dark brown.

Results of Analysis expressed in Parts per 100,000.

Companies or Local Authorities.	Total Solid Matters.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen, as Nitrates and Nitrites.	Total combined Nitrogen.	Chlorine.	Total Hardness.
Inner Circle.								
Thames—								
Chelsea	28·20	·331	·026	0	·171	·197	1·50	18·6
West Middlesex	28·06	·289	·021	0	·207	·228	1·50	18·6
Southwark and Vauxhall	28·34	·415	·047	·001	·169	·217	1·43	18·0
Grand Junction	27·90	·309	·028	0	·192	·220	1·42	18·3
Lambeth	30·68	·255	·025	0	·268	·293	1·70	19·1
Other Sources—								
New River	27·60	·175	·010	0	·242	·252	1·52	19·1
East London	29·20	·193	·017	0	·259	·276	1·70	19·7
Kent	39·90	·054	·007	0	·392	·399	2·45	25·4
Outer Circle.								
Colne Valley	13·46	·051	·003	0	·343	·346	1·35	4·9
Tottenham Board of Health	49·34	·023	·006	·003	·598	·606	3·35	27·1
Corporation of Birmingham*	24·60	·203	·025	·002	·237	·243	1·90	16·4
Corporation of Glasgow+	2·70	·131	·000	·000	·003	·003	·70	1·1

* Analyzed by Dr. Alfred Hill, Medical Officer of Health and Analyst to the Borough.
† Analyzed by Dr. E. J. Mills, F.R.S., of the Andersonian University, Glasgow.

Note.—The numbers in the analytical table can be converted into grains per imperial gallon by multiplying them by seven, and then moving the decimal point one place to the left. The same operation transforms the hardness in the table into degrees of hardness on Clark's scale.

Major Bolton reports that the state of the water in the Thames and Lea was bad during the first half, but fairly good during the latter part of the month of April. The water in the river Thames at Hampton, Molesey, and Sunbury (where the intakes of the West Middlesex, Grand Junction, Southwark and Vauxhall, Lambeth, Chelsea, and East London Companies are situated) was bad during the first half of the month. The highest flood state of the river was 3 feet above the (6 feet) summer level, and the lowest was 5 inches above summer level. The highest temperature of the water taken at Seething Wells was 52°, and the lowest 44°, while the highest temperature of the air at the same place was 56°, and the lowest 42°. The condition of the water in this part of the river was indifferent on 12 days, and bad on 18 days during the month. The highest flood state was 4 feet 8 inches above, and the lowest 1 foot 6 inches above summer level. These observations were made daily at 9 a.m. The rainfall for the month was 3·0 inches.

Dr. Whitmore's report on the composition of the Thames companies and other waters supplied to Marylebone during April:—

—	In Grains, per Gallon.			In Parts, per Million.		In Degrees.	
	Total Solid Matter.	Loss by Incineration.*	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Hardness.	Hardness after boiling Fifteen Minutes.
West Middlesex	19·84	0·80	1·10	0·10	0·076	13·6	2·8
Grand Junction	20·84	0·88	1·08	0·00	0·80	14·1	3·0

* The loss by incineration represents the amount of organic and other volatile matters contained in the Imperial gallon (70,000 grains) of water; the total solid matter, *minus* such loss, consisted chiefly of carbonate of lime, with small quantities of equally harmless salts.

The water of both companies, as seen through a glass tube 2 feet in length, was clear and well filtered.

Kent Water-Works Company.—The directors of this company have given statutory notice to the Metropolitan Board of Works of their intention to bring further large portions of their district in the parish of St. Giles, Camberwell, under the constant supply system.

DEATH FROM INHALING COAL GAS.

On Monday, May 7, an inquest was held at the Essex County Gaol, Springfield, Chelmsford, before Mr. C. C. Lewis, coroner, and a jury, touching the death of a prisoner, named Charles Wright, *alias* William Wallman, aged 28, who died on the previous Friday in the infirmary of the gaol.

Captain *M'Gorrery* said: I am the governor of the gaol. The deceased was a prisoner, having been committed from Billericay, in April, for trial at the adjourned sessions, on the charge of stealing half-a-crown. He appeared to be in good health on Tuesday, the 1st inst. On the following morning, about seven o'clock, my attention was drawn to him. I went to him directly, and found he had been carried out of his cell, and was lying insensible and speechless on the deck or gallery just outside. Mr. E. Hunt Carter, the gaol surgeon, had been sent for, and came shortly afterwards. The deceased was by his orders removed to the infirmary, and he was under his care until he died, at three o'clock on the morning of the 4th inst. I saw the deceased several times after his removal to the infirmary. Each time he was unable to speak. At the time I went to his cell, on the morning of the 2nd inst., it smelt strongly of gas, although the door had then been open for some time. There is a burner in each cell. I believe the gas was lighted about eight o'clock on the evening of the 1st inst., and it should have been extinguished at nine, by being turned off outside the cell. Any prisoner can blow out the gas, but he has no tap to turn it off with. I have known several cases of prisoners blowing the gas out. When detected they are punished for it. The burner is about two feet from the floor. I have known prisoners put out the gas all along the deck by blowing down the pipe.

F. W. Butcher: I am principal warder at the gaol. It was my duty to turn on the gas on Tuesday evening, May 1, and I did so about 7.30. The process is for the warder to turn the gas on outside each cell, and pass a candle to the prisoner through the trap-door of the cell with which to light it. I saw the deceased light his gas on the evening in question, and he then handed me back the candle through the trap-door. The gas should have been turned off at nine o'clock. The prisoner could have blown it out at any time. At ten minutes past six on Wednesday morning, the warder on the deck drew my attention to the deceased. He was lying insensible, on his back, undressed. I spoke to him, but received no answer. He breathed heavily. I threw the door wide open, and ordered the ventilator to be opened also, as the cell smelt very strongly of gas. About three minutes afterwards the deceased was carried out of the cell in his hammock, and laid upon the deck, and when he had been seen by the surgeon he was taken to the infirmary. It was Hill's duty to turn off the gas on Tuesday night. A warder on the deck could not smell an escape of gas in a cell if the trap-door was let down.

Alfred Hill: I am a warder at the gaol. I went on duty on the deck where the deceased's cell was at eight o'clock on Tuesday night. The gas had been previously turned on. It was my duty to turn off the gas, and to receive through the trap-doors of the cells the clothes of each prisoner. I undid the trap-door of the deceased's cell, and he put his clothes out about seven or eight minutes to nine. There was at that time a light in the cell, which was at one end of the deck. I then went to the other end of the deck, and began to turn out the gas of each cell. I cannot say whether I turned the deceased's gas out. When I came to his cell the light was out and I shut the trap-door. I did not smell any gas. On Wednesday morning, about seven or eight minutes past six, I unlocked the cell door to put the deceased's clothes in, when I found him lying on his hammock in a state of unconsciousness, and there was a strong smell of gas. I looked at the gas-tap directly, and I then found the gas turned on slightly. I believe now that I had not turned it off over night. I turned all the gas off at the main at three o'clock on Wednesday morning.

George Edwards: I am a prisoner in the gaol, and have been acting as nurse in the infirmary. The deceased was brought there on Wednesday morning, just before eight o'clock, in a state of insensibility. He was under my care till he died at three o'clock on Friday morning. He took a little strong tea and brandy as ordered by the doctor, and had every care and attention he required.

Mr. *E. Hunt Carter:* I am surgeon to the gaol, and was called to the deceased about half-past six on Wednesday morning, and I saw him about seven. I found him outside his cell lying in his hammock. There was a very strong odour of gas in his cell. He was perfectly insensible, and his mouth was covered with frothy matter. The respirations were 56 to 58; the skin cold, and the jaw firmly closed. He had already had some brandy. I caused him to be removed to the infirmary. I saw him several times during the day. On my second visit I noticed a large quantity of bloody frothy matter about the mouth, and the last witness told me he had bitten his tongue nearly through. I could not open his mouth. His unconsciousness remained. I last saw him about half-past six on Thursday evening. He was then pulseless. In my judgment the cause of death was coma arising from inhalation of gas. In a small cell like that a man would soon become giddy and insensible if the gas were on.

The Coroner said he had himself known the deceased a long time, and had always thought he was a fitting subject for an asylum.

Mr. *Carter:* He was certainly a man of a low type of intellect.

The Coroner said he had no doubt the opinion formed by Mr. Carter was the correct one, but from the fact that particular attention had lately been paid to inquests at gaols in the House of Commons, he would advise the jury to have a post-mortem examination made of deceased by the gaol surgeon, in the presence of an independent medical witness, in order to prevent the possibility of fault being found afterwards.

The inquest was then adjourned.

On Wednesday, May 9, the inquiry was resumed.

Dr. *Carter* said: I made the post-mortem examination of the body yesterday afternoon at three o'clock, assisted by Dr. Nicholls and the Messrs. Wheeler. I opened the head and chest, but found nothing unusual. The body seemed to be well nourished, but the lungs presented a very dark appearance, and were entirely congested, being gorged with blood. They were otherwise healthy. The right side of the heart was distended with partly coagulated blood, but the heart itself was healthy in structure. The stomach contained about two ounces of yellow matter, but was otherwise healthy, while the liver showed symptoms of fatty degeneration; the spleen was somewhat enlarged, but soft and pliable; the brain was small and healthy; one of the ventricles of the brain contained a small quantity of serum. The cause of death, in my belief, was coma, produced by the non-aëration of blood, which, after hearing the evidence, was to my mind, produced by the inhalation of coal gas.

Mr. *D. Wheeler* corroborated the evidence of the last witness, and stated that he entirely agreed with him.

The Coroner summed up the case to the jury, pointing it out as very remarkable that the turnkey, on passing the door of the deceased's cell after the gas was out, should not have smelt it, and that no sound should have been heard to proceed from deceased, as the frothy matter round his mouth showed that he must have died a "hard death."

The Jury returned a verdict in accordance with the medical evidence—namely, that the cause of death was the accidental inhalation of coal gas; and appended a rider to the effect that the gas-burners were not under proper control, they being unprovided with stops.

TRANSFER OF THE BLACKBURN GAS-WORKS TO THE CORPORATION.

A Special Meeting of the Blackburn Town Council was held on Saturday, May 12—the Mayor (Mr. W. H. Hornby) in the chair—for the purpose of considering the desirability of purchasing the works of the Blackburn Gas Company.

The Town-Clerk, at the request of the Mayor, explained the terms on which the Parliamentary Committee proposed to take over the gas-works. He said the members of the corporation who were present at the meeting of the council when they went into committee, would, no doubt, remember the terms which the Parliamentary Committee had then offered the gas company for the purchase of their works. At that meeting a resolution was passed that they should not go beyond the offer which they had then made, the point in difference between the corporation and the company being in respect of the C shares. The difference between them was £1, the company asking £4 on these shares, and the corporation offering £3. The Parliamentary Committee, acting upon the resolution passed by the council, did not feel in a position to make any further advance, but they wisely considered that they should be properly and well advised by some one who was well versed in matters of this nature. They accordingly consulted Mr. G. W. Stevenson, who, having inspected the works, reported very favourably upon them. The committee renewed negotiations with the directors of the company, and the following terms had been come to:—The share capital of the company consists of 6000 A shares of £15 each, fully paid up; 6000 B shares of £15 each, fully paid up; and 11,607 C shares of £10 each, but only £5 per share called up. The terms of purchase agreed upon were the payment of a bonus of £2 per share and 10 per cent. in perpetuity on A stock; a bonus of £2 per share and 7½ per cent. in perpetuity on B stock; and a bonus of £3 10s. per share and 7 per cent. in perpetuity on C stock; the remaining share capital uncalled up not to be called up. No further capital was to be called up, and the corporation had not to take over the works until the 1st of January next, but the company had to work the concern for the whole of this year for the benefit of the corporation. Whatever reserve-fund there might be at the end of this year, when the balance-sheet was drawn up, would be equally divided between the corporation and the company. The Parliamentary Committee now asked them to confirm their offer. In answer to an inquiry,

the Town-Clerk said the reserve-fund, when the balance-sheet was made up last year, was £6000, but out of this amount some works which were now being carried on would have to be paid for, and the reserve-fund would then amount to about £5000. The reserve-fund had to be divided.

The report of Mr. Stevenson, which we published in our last, was then read.

Mr. Parker asked the Mayor if the Parliamentary Committee were unanimous in recommending the purchase of the gas-works.

The Mayor said there was only one man on the committee who had a doubt. He really did not see what the town had to lose by the purchase. As far as regarded the bonus of £2 per share on the A and B shares, it would, in fact, be no bonus at all. The bonuses on these shares would amount to £24,000, but the directors of the gas company said that there were back dividends due on these shares to the amount of £25,000, which they could call up from the public and pay. The corporation, therefore, were in reality not giving any bonus, because the gas company could charge the public with back dividends to the extent of £25,000. Then they were only paying a bonus of £3 10s. on the C shares, and that was in lieu of interest on money. In reality they were paying the shareholders for the prospective advantages of their shares. Of these shares there were 11,607, and £5 per share had been called up. In time to come the company would have to call up the remaining £5 per share, and they would have power to charge 7 per cent. on the whole. Instead of calling up the remaining £5 per share and paying 7 per cent., the corporation proposed to give a bonus of £3 10s. per share, and to borrow any capital that might be wanted at 4 per cent. There would therefore be no great loss to the town. The whole matter really lay in a nut-shell. If the company continued the works they would have power to pay back dividends; and it just came to this—whether it would be more advantageous to have the works in the hands of the corporation or in the hands of the company? He did not suppose that in the long run it would make very much difference; but one advantage in the corporation possessing the works would be, that the streets would not always be liable to be pulled up at a moment's notice, just at the bidding of the directors of the gas company. He therefore moved that the corporate seal be affixed to an agreement for the purchase of the gas-works by the corporation from the gas company.

Mr. Beads, in seconding the resolution, said there was no doubt but they were proposing to purchase the gas-works at a very high price—the highest that had been paid by any corporation in the kingdom. But they were purchasing probably the most complete works ever transferred by a company to a corporation. They were proposing to pay bonuses amounting to £64,264 10s., in addition to maximum dividends on all share capital called up. They must bear in mind that there were 11,607 £10 shares, with only £5 paid, and the company had thus power to call up £58,035, on which the holders of the stock were entitled to a dividend of 7 per cent. when called up. Under the committee's agreement with the directors of the gas company, this capital would not be called up, but when money was needed the corporation would borrow at 4 per cent. Now, the difference between 4 per cent. and 7 per cent. on £58,035 amounted to £1741 per annum, which at 25 years purchase amounted to £43,525. The committee had done the best they could with the directors, who, no doubt, feeling they had a valuable monopoly, had done the best they could for their shareholders. No doubt there would be some loss during the first few years. He did not mean absolute loss. At the end of five years from the coporation taking possession of the works a sum of £5944 2s. would have to be invested annually, so that in 100 years the works would stand free of charge. Now, if the rate of gas consumption continued to increase during the next twelve years at the same rate as it had increased during the last ten years—namely 6½ per cent. per annum—the gas-works would have been self-sustaining in addition to creating a fund for their redemption amounting to over £35,600. In his opinion, nothing could prevent the gas-works being a profit to the corporation, except continuous bad trade—a calamity which would arrest the progress of the town. So far as he knew, they had no reason to apprehend this, but they might expect a steady growth of the town for many years to come. If this should be so, it was a prudent thing to purchase these works, and the generations following would be greatly benefited by what they were proposing to do that day.

The Town-Clerk, in answer to an inquiry, said the bonuses would be paid on the 1st of January next.

Mr. Smith said the best thing the corporation could do was to purchase the gas-works, for there were no more substantial or better works in this country, and they would last for many generations to come. Better works could not be put together, and they had been constructed regardless of cost.

The motion was then put to the vote, and carried unanimously.

WEST OF SCOTLAND ASSOCIATION OF GAS MANAGERS.

After the reading of the report on the Aitken and Young Process, as given in last Journal, page 752 *et seq.*

Mr. Dunlop said: Gentlemen, the report which has just been read to you on this new process of Messrs. Aitken and Young is so full and complete that it leaves me, indeed, very little to say. At the outset I may incidentally mention that, for my own personal satisfaction, I took tests immediately after those taken by your committee, and my results correspond exactly with those which have just been submitted to you. However, as has been stated in that report, there are certain things connected with this new process which can only be satisfactorily tested by trials extended over considerable periods of time; as, for instance, as to whether the prolonged heat to which the tars are subjected has a tendency to cause them to pitchify, or be deposited as a char on the heated surfaces to which they are exposed; the relative quantity and quality of the tar and ammoniacal liquor from the old and this new process; the relative purity of the gases from each process, with the quantity of purifying material required, and as to whether the hydrocarbons suspended by this new process are permanently suspended in the gases and conveyed to the consumers, or whether they are in part deposited. I think the best way for me to place this matter before you is just to give you a note of my experience of the process since it was introduced into the works at Hamilton. First, then, gentlemen, so far as my experience has gone, I am perfectly satisfied that the high heat to which the tars are subjected—from 212° to 224° Fahr.—has no other effect upon them than to prevent them absorbing illuminants from the gas, and to distil from them the naphthas which they may have absorbed before reaching the analyzer. My reason for believing this will be gathered from the following facts. The bottom casing of the analyzer, from the time it was fitted up, was never perfectly tight, but as it was expected it would take up after working for some time, it was kept at work for upwards of three months; at the end of that time, seeing it was hopeless to expect it ever to be tight, I had it thrown out of action for repairs. I then carefully examined the contents of each tray and the surfaces of the heated casing-plates, and found the plates were as clean as the day they were erected, not a single particle of scale or pitch being upon them. The three lower trays contained tar, and each successive tray contained lighter and lighter tars, till, on reaching the two uppermost, only naphtha was found. With reference to the quantity of tar, I regret to say I cannot speak very definitely, as during the period prior to the introduction of the analyzer the tar and ammoniacal liquor were sold in a mixed state, and, therefore, I am unable to state the quantities of tar and ammoniacal liquor per ton distilled; but on comparing the gross quantities produced from both processes, I find a considerable gain is shown from the new process. This at first sight may appear strange; but it is easily accounted for by the fact that the analyzer removes nearly every trace of tar, and prepares the gas to be more perfectly acted upon by the denuded water from the analyzer; whereas, when the old process was employed, a very considerable quantity of suspended tarry matter was carried forward to the first purifier, and, getting deposited on the lime, was thereby lost. Of course, there is this material difference between the tars I formerly produced and those I have now, the latter being thick, sirupy, containing little or no naphtha, and have just the appearance of what is known as boiled tar. As to what may be the relative value of the tars from the old and new processes, it would take a longer experience and a more extended application of the new process before the tars would find their level; but, from inquiries I have made, and from offers received for the boiled tar, I am satisfied that a price could be got quite equal to that received for ordinary tar. There is this further advantage in the analyzer process that a much stronger ammoniacal liquor can be obtained, as the gases, being prevented from giving up their ammonia in the analyzer, enter the bottom of the scrubber in a condition capable of giving a strong liquor. I have next to refer to the amount of lime required by this process. In respect of purifying plant, the Hamilton Works are rather badly placed. There are only four purifiers, eight feet square, to pass nearly 140,000 cubic feet of gas in 24 hours, necessitating in mid-winter the changing of two purifiers daily, and further, as both the coal and shale give off a very considerable quantity of CO_2 and HS_2, the lime account is rather high. The make of gas also increased very rapidly during the 12 months ending April last. The make for the year 1876 was over 22 million cubic feet, while for the year ending April, 1877, it was upwards of 25 millions. The increase having taken place principally during the winter months, burdening the already deficient purifying power to a greater extent, one would have expected it would have necessitated an increased quantity of lime per 1000 feet of gas purified. On looking over my books, however, I find this not to have been the case, as from the superior manner in which the gases have been prepared for purification by the analyzer process, although the make was three millions more than last year, nearly the same quantity of lime has been used—viz., for the year ending April, 1876, 170½ tons; and for the year ending April, 1877, 172 tons, showing a saving of 12 per cent. This now brings me to speak of the permanency of the naphthas which have been diffused through our gas. And I believe, had we only made the same quantity of gas this year that we did last, we should have saved upward of 20 per cent. of our lime. I am fully satisfied, from experiments I have made at the works and at the distant testing-station, that our gas is just as permanent as, if not more so than when made by the ordinary process. The only difference which I can detect between the old and this new process is, that what little naphthas we have to pump from our gasholder drip-boxes are neither so great nor so heavy, or dark and tarry, but are quite pale and transparent; and I believe this small quantity of hydrocarbon liquid falling from the gas to be due to the water accompanying it in a solvent manner, causing it to deposit. I may also state that for a short time I made a series of experiments with the hydrocarbon or water-gas process, by fitting up one of my ovens in the manner explained by Mr. Young at our Greenock meeting last year. The results showed that a very large yield of gas could be got per ton of bituminous coal distilled, but that it would not pay to employ this process when coal could be got as cheap as at Hamilton. The gas was perfectly regular in quality, and I believe, when coal is high priced, the water-gas process could be practically wrought by the analyzer condensing arrangement, and to a substantial profit. I have no doubt that many of you will be surprised at the great gain in illuminating power resulting from the small quantity of naphtha vapours added to the gas. I confess, at first, I could hardly believe it possible; but experience and experiment soon convinced me that it was substantially true. Had time permitted, I should like to have given you the results of those experiments—perhaps at some other time I may be permitted to do this; in the meantime, I may briefly state that I believe the cause to be due to the greater density of the naphtha vapours, and the high per centage of carbon in their constitution. I will close by reading an extract from a paper read by Professor W. Dittmar, at the meeting of the British Association in Glasgow last year, showing the wonderful difference in the amount of light given by adding different hydrocarbons to hydrogen, the only difference being that the carbon in the one was in a much more condensed state than in the other. (See Journal of Gas Lighting, vol. xxviii., p. 669.)

Mr. Peebles: I beg to state that I think the labours of this committee deserve our very best commendations. What I observe in connexion with this report is the great honesty of purpose that seems to pervade the whole of it. The experiments have been gone into in the most intelligible way, and with a direct aim at truth. There is no mystery whatever to be seen in connexion with it. I have had something to do with inquiries of this sort, and I must say there was always some little thing that was under the rose which could not be got at—something that was hardly ready to be seen, and that, if we would wait a little longer, it would all be made clear. I remember visiting East Barnet, when Dr. Eveleigh's process was going on. At that time it was involved in a good deal of mystery, and I think that any one who takes up Dr. Eveleigh's process will see that the Doctor's imagination went a long way. At last, however, the bubble burst, and the poor unfortunate shareholders came to a bad end. With this process it is different because we see one of its projectors objecting to the results brought out by people appointed to conduct the experiments, on the ground that these experiments were of too satisfactory a description. Instead of making the best use he could of this report, he would not be satisfied until the experiments were gone over again. That speaks volumes not only for the honesty of purpose of the inventors, but also for the method which the committee adopted in conducting these experiments. I have always thought, since first I heard of this process, that it would be remarkably efficient, and ultimately, I have no doubt, it will turn out to be all that is expected. I am pleased to have had such an intelligible account of it, and I think this investigation should form a precedent for future investigations—that there should be an entire absence of the mysterious. Everything should be fair and above-board, and every facility should be given by gas managers for everything being seen. This has been the case here, and I think Mr. Dunlop deserves our best thanks for the facilities he has given to the committee to see and to go so thoroughly into this matter.

Mr. Stewart (Greenock): The committee did me the honour to ask me to assist in this matter, and I would like to say a word or two. Between the first and the second table there is a considerable difference in the amount of the sperm value, and that may lead to some questions. I think, however, I should say that everything was done in a most careful manner, notwithstanding the difference arrived at. Perhaps it would be well if Mr. Young would point out the reasons which occur to him accounting for that difference, because if that table should go before the public without an explanation accompanying it, an erroneous impression

might be formed in regard to the value of the invention. I would also have liked to have tried some experiments with second-class coals by themselves, as it would have been interesting to see the results arrived at. I have no doubt, however, but that there would be considerable increase in the sperm value per ton of coal, or, in other words, increased average illuminating power. Further, I would suggest whether it would not be an advantage, in case of works making a large quantity of gas, to have two or more analyzers, so that in summer time, when the make of gas is small, one analyzer only need be used, to avoid the risk of making the tar pitchy, which there would be a probability of if the whole analyzer power were employed as during the time of maximum make. I should like that some persons would ask questions, so that the whole process may be discussed. I may say that the experiments were openly and fairly conducted, and if explanations are wanted, now is the time, so that there may be no after-talk or disappointment.

Mr. YOUNG: I rise with great pleasure indeed to make all the explanations within my power in regard to the trials made at the Hamilton Gas-Works. In the first place, I may be allowed to explain that preliminary trials, to ascertain whether or not there was anything in the process, were first conducted at Causewayhead, where there were small works erected for the purpose of testing the material made by the Mackenzie process. We altered these works so that we could roughly test this process, and we found considerable gain. But as I could not very well devote my time to conduct the experiments at Causewayhead, at the desire of Mr. Aitken I erected a small experimental apparatus at the works at Clippens. Of course, I am quite aware that results got from a small experimental apparatus are not to be depended on, but they give comparative results. The average result of these experiments was a gain of something like 15 per cent. in the illuminating power. In all cases we had a gain, sometimes greater and sometimes less, dependent upon the nature of the coal, but invariably the gain was greater where mixtures of rich and poor, or common, coals were employed. Mr. Mitchell, now of Coatbridge, was my assistant during these experiments, and he can substantiate my statements. When the experiments were entered into at Hamilton, I made it a point to stay away, and to leave the committee unbiased in their judgment. They made experiments and obtained results, and submitted those results to a meeting of the committee, at which I was present. After hearing the report, I rather thought that there had been a mistake—that an error had crept in somewhere, as the results were higher than I had got, and higher than I expected them to be, and, I believe, were above what the average of results will be; but, at the same time, I am satisfied that the results brought out by the second table will be obtained. Midway between the two tables, perhaps, will be something like what is to be got by working third-class parrot coal with shale. I have thought over the matter, and the only way in which I can account for the extra high results you will notice in the first experiments, is that heavier charges were used in the retorts, and that a smaller yield of gas per ton was produced, and consequently the likelihood of greater production of naphthas. Further, the temperature of the surrounding atmosphere was higher, which would enable the gases to hold in diffusion a greater quantity of those naphtha vapours so produced; for, as you all know, even when the ordinary process is employed, the gases during the warm weather are always richer from a given quality of coal than from the same coal during the winter months. Indeed, the gases will take up during the warmer months of summer the volatile hydrocarbons which may have been condensed and deposited in the gasholder, &c., during the winter months. On the other hand, during the later experiments the charges employed were much lighter, and the heats higher; consequently, as shown by the table, there was produced a larger volume of gases, and also there would be, for the same reason, a smaller quantity of undecomposed naphthas. Further, during these latter experiments, the weather was very much colder, to the amount of some 15 or 20 degrees; therefore the gas would be unable to take up and hold in diffusion such a large volume of naphtha vapours. The difference in the quantities of naphthas is not indicated by the table, but this may be from the fact that it is difficult to get a fair average sample of the tars from this new analyzing process, because the whole of the trays of the analyzer are filled with tars varying in character, the bottom trays containing tars nearly entirely denuded of naphthas, and resembling what is known as boiled tars; the upper trays, on the other hand, containing pure naphthas, the whole amounting to something like four or five tons. It will, therefore, be quite evident that, before a fair average sample of the tars could be got, it would be necessary to work the process for such a length of time as would completely fill the whole of the trays of the analyzer. There was also a longer period of time between the second set of experiments, and, as already explained, it requires this process to be worked a considerable time before accurate results can be got, in consequence of the washer, &c., being charged with naphthas, which would be taken up by the ordinary gases were the ordinary process immediately to succeed that of this new analyzing process. I therefore think that the second set of experiments are more to be relied upon than the first. Perhaps, as I have already said, if you strike a mean between these two tables, you will arrive at what would be the actual results from this new process. There is one other result in the table on which I would like to make a few remarks—that is, though the low illuminating power of the gas produced by the ordinary process of a mixture of Camp parrot and shale there indicated should have given a gas of something like 25-candle illuminating power, yet, as indicated by the table, the result by the ordinary process is only 23·30. I am satisfied this is easily accounted for by the burner. To make certain that it was the same burner which was used through the whole of the experiments, it was marked. At the conclusion of the experiments I had that burner tested, and I found that it gave results very much inferior to a first-class burner. However, our results here are only comparative; but we are certain they are relative, because they were all done with the same burner and the same candle. That is the explanation I have to make, and if there are any further questions to be asked, or information I can give, I will be most happy to give it. We are most anxious to get this process thoroughly tested, because, if it is "humbug," as Mr. Brodie characterizes certain things, it will fall to the ground; but if there is anything in it, I am sure it will fight its own way.

Mr. MITCHELL: I have spent many valuable hours with Mr. Young in experimenting with this and other processes. From the table shown there is a great saving effected on the two processes. The experiments at which I assisted were mostly with the water gas, and the results with the analyzer process were marvellous. So much am I convinced of the advantage to be derived from this process, that in laying down the ground plan for new works at Coatbridge, I have made arrangements to have the analyzer erected.

Mr. HALL (Berwick): I think it would have been much better if the coals had been kept equal, because the difference in illuminating power might arise from the mixture. Shale, as those who have experience in working it know, has a greater illuminating power than splint. An analysis of each of these coals might have been giving in the tables, as stated by some analytical chemist, showing the difference between the illuminating power of the coals as received from the pit, and the results by the analyzer, and then we could have seen the difference.

Mr. STEWART: The per centages of coal are precisely the same, although the quantities are different.

Mr. YOUNG: I may be permitted to mention this, further, that the figures in the tables are founded not on results made with coal worked for the purpose of giving the best analytical results. We all know that the analysis of coal which is supplied to us is, as a rule, not the actual yield got in practical working. What we have tabulated here are the actual results obtained by the commercial working of the coal in the same retorts, passed through the same scrubber, the same purifier, the same meter, and stored in the same gasholder; the same photometer, the same candle, and the same instruments were employed in ascertaining the illuminating power—the only difference being the modes of condensation; so that we have exact comparative results of the coal. We all know that shales and coals are variable far more than the difference in the per centage of results given by the tables; but the coals and shales were in the work in bulk, and the tables now show the comparative results of the actual work, and not what might have been obtained in a laboratory experiment. There were 15 retorts employed, and they worked 36 hours on the one occasion, and 48 hours on the second occasion.

Mr. SCOTT (Musselburgh): I have no doubt the process is a good one. What we want to do in distilling the coal is to make the gas serve the public, and make as much profit to the companies as we can. I believe that that process and another process which has been in operation, if thoroughly carried out, would be the means of enabling gas companies or corporations to meet the high demand of later years for wages and the increased price of coal. What I would like to know is, whether this process demands more care on the part of the workman, and does it compensate for the new apparatus which requires to be introduced? I should like also to know whether it involves additional duties to the superintendent. I have had a process working for some time, and I am perfectly convinced that it is a profitable process if it is accurately carried out; but with my process I have experienced some difficulty in doing this. I had not only to teach the men to work this process, but I had also to unlearn them the process they had previously been accustomed to. This I experienced some difficulty in doing; but to satisfy myself as to its value, old as I am, I have stood 36 hours at a stretch. I may state this process has entailed considerable extra care upon me, and I am not so able for it now as I once was; but I am sure, if in the hands of a young energetic man, it would become a success. Now, I want to know, can this new process be conducted easily, and to the same advantage?

Mr. DUNLOP: I may say I have never had any trouble in attending to the analyzer since it was introduced. The steam is turned on at the analyzer by an ordinary steam stopcock, and it has not been touched for months. The temperature applied to the tars in the analyzer depends upon the pressure of the steam. We have a pressure of some 20 lbs. on our boiler; but even if the pressure were only 10 lbs., I do not think it would make very much difference, provided there was a temperature of over 212°. In my opinion, at this temperature you can liberate most of the naphthas from the tars permanently suspendable in the gas. By using proper proportions of coals, I have found that we can suspend the whole of the naphthas produced with the gas, leaving the tars with scarcely a trace of naphtha in them; but during the course of last winter, to keep up my supply, I had to use for a short period of time a superior quality of coal, and I found that then the gases were not able to carry away the whole of the naphthas, and that the tars always contained more or less of them. Where steam-boilers are used, there is no additional expense, except that of generating the steam, which is very little.

Mr. KIRKLAND (New Cumnock): Would steam or fire be best? Could it not be done with fire without steam?

Mr. YOUNG: Well, this process, of course, is just in its infancy, and we cannot say what will be best; but we know that both fire and steam will answer the purpose, provided the temperature does not go above a certain point, and is not allowed to get below a certain point. I believe it could be worked perfectly by using the spent heat from the retort-ovens, and conducting it under the analyzer to produce the necessary temperature inside the analyzer, because it is, to a certain extent, self-regulating. This will be easily understood when I explain that this new analyzing process consists essentially of two processes—namely, a condensing and a volatilizing one; the lower portion, where the heat is applied to the tars, being the volatalizing one, and the upper being the fractional condensing one, and the relative amounts of condensation and evaporation may be modified in extent. Thus, suppose that the extra heat is applied to the tars in the lower half of the analyzer, and an extra evaporation be produced, it will be evident that the colder surface of the upper part of the analyzer will condense and return a larger quantity of cooled liquid to be revolatilized, and that, on the other hand, if there is a lessened volatilization in the lower half of the analyzer, there will be a smaller quantity of recondensed liquids returned to the lower heated trays, and consequently less heat expended. In this way, it becomes, to a certain extent, self-regulating. The keeping up of the temperature by steam is a simple process. If you keep a constant pressure of steam on the boiler, you will have a fixed temperature applied to the tars, and, so far as I have seen, it requires no attention whatever. In regard to the remark of Mr. Dunlop, I have to say, if you use coal giving 36-candle gas, the gas will not carry away the naphthas, because when gas of this character is manufactured, there will be produced from 7 to 10 per cent. of naphthas, and that is more than the gases are able to carry away in diffusion. Hence the reason why, with a good coal, we endeavour, by employing a higher heat, to decompose part of those naphthas and utilize them to carry away a further quantity of fluid—liquid—in the shape of permanently diffused vapour, or employ the gases from some other poor coal to carry these vapours.

The PRESIDENT: I have to reply to a few questions. First of all I have to thank Mr. Peebles for his kind remarks on the endeavours of the committee to bring forward a report of their investigations in as plain a manner as possible. Mr. Young referred to the quality of the gas being better by reason of the temperature. The secretary read a portion of the report bearing on that subject, which explains itself. Mr. Young also referred to the difference between the results of the first and the last tests. During the tests in October we had fine sunshiny weather, but during the later tests there was no sun, but severe frost, and as much as six inches of snow on the third testing. The temperature in the hydraulic main was from 180° to 190° during the first test, and during the second test it was only from 160° to 170°. That was not caused by the absence of the sun, but by a new arrangement made with the retorts. Three additional retort-ovens had been erected, and the retorts were working at each end of the hydraulic main, so that there would be 30 or 40 feet of the hydraulic between the benches, distributing the heat to that extent. The temperature of the analyzer, which is outside, exposed to the rays of the sun and the effects of snow or frost, was during the former trial from 220° to 230°, and during the latter from 214° to 224°. In reference to Mr. Hall's remarks, it does not require much calculation to show that 289 and 44 is the same proportion as 269 and 40½. The statement of the result which we got by the ordinary process is far more reliable and preferable to put before you than an analysis from any chemist analyzing gas coal. In reference to

Mr. Scott's remarks, I may say that we did not experience nor did we see any difficulty or trouble in managing the analyzer. It is a simple, self-acting thing if you keep the tars at the proper temperature.

Mr. M'Gilchrist: Perhaps, if the report were printed, and managers had time to consider its contents, they would be better able at next meeting to put questions in reference to any difficulties which might suggest themselves. I move that the further discussion of this subject be adjourned till next meeting.

Mr. Nelson: I support the view of Mr. M'Gilchrist, on the ground that one cannot put a question on the spur of the moment, nor can another be expected to answer it. I think this is a valuable matter. The process has been backed up by the evidence of those for whom I have the highest respect. I am further glad that I was here to see the charitable manner in which the process has been received. I endorse every word that Mr. Peebles has said, and I think the spirit in which this report has been received is just the spirit in which reports of this kind ought to be received. Therefore I support Mr. M'Gilchrist's motion, and second the vote of thanks to the committee, proposed by Mr. Peebles.

Some discussion followed on the question of adjourning the debate on the report, which ended in an invitation to members to put further questions in the meantime.

Mr. A. Bell (Gibraltar): I am sorry I did not hear the paper read. It is of interest to us abroad, where our secondary products are of no use. Not only can we not get anything for them, but we have to pay for their destruction. Has the process ever been tried with English coal?

Mr. Young: No; except experimentally. English coal, however, very much resembles in character ordinary Scotch coal, and it gave a per centage of increase equivalent to the naphthas in the tar. In fact, the process is based on the fact that gases have the power of taking up the naphthas which are ordinarily distilled from the tars, in the process of refining the tar into its various products—that is, if you take the tars resulting from a ton of coal, and distil them, you will get something like a third, or, perhaps, two-thirds, of a gallon of naphtha, dependent on the character of the coal, and, if you present this isolated naphtha to the gas which was derived from the coal, the gas will take up that naphtha, and hold it permanently in diffusion, showing conclusively, I think, that the tar, during the process of condensation, had such an affinity for the naphthas that it denuded the gases—took the naphthas from the gases to itself. Therefore the whole process is based on the simple volatilization of the naphthas by the gases, and I believe in warmer climates it will be of great advantage, because there the gas has the power of carrying a larger volume of vapour than with us, and, I suppose, at Gibraltar, where the average temperature is 70° over the year, you will have a larger volume of naphthas in your gases than here.

Mr. Bell: Is there no danger of pitchifying?

Mr. Dunlop: I think I can testify to that. Mr. Brodie, who was inside the analyzer, can tell you that there was no appearance of such a thing, and that was after the analyzer had been working for perhaps four months.

Mr. Brodie: I was inside the analyzer, and there was no pitch about it. I believe, from the questions which have been put, that there are a number of members who imagine that there is some difficulty in working this process. An ordinary steam-boiler, with a safety-valve, and a cock to turn on the steam, are all that are required, and the management of these present no difficulty to a man who can change the purifiers.

Mr. Bell: Does it absorb the naphthaline?

Mr. Young: That is an experiment we have not tried; but we intend to try whether it prevents a deposit of naphthaline in the mains. I believe it will be a complete cure for that. It is customary, where naphthaline is giving trouble, to take naphthas that have been distilled from the tars—pour them into the mains, and they remove every trace of naphthaline. By this process we get gases to carry away the naphthas produced with the tars, and not only so, but a portion of the heavier naphthas, which are not suited for being permanently diffused, are left in the upper trays, and as they flow back over the wire gauze from the first tray, the whole of the gases that pass through that gauze come in contact with these naphthas, and they, having a strong affinity for naphthaline, the naphthaline is carried down or, in other words, washed out of the gas. Therefore I believe it will remove that great nuisance, naphthaline, from the English gases.

Mr. Kirkland: You use water as well as steam to wash it?

Mr. Young: We use no water. Of course, water condensed in the upper trays is streamed back, and in streaming back over the wire gauze of the other trays it becomes denuded of its ammonia, and, as it has already been saturated with hydrocarbons, it has not the same tendency to take up the naphthas from the gas that ordinary pure water would have. We, therefore, use it as the washing liquid in the scrubber.

Mr. Kirkland: Would the heated air from the retorts not have something of the same effect?

Mr. Young: Heated air would have the same effect, provided it was [illegible] high to volatilize the naphthas.

Mr. Brodie: If you had fire instead of steam between the space at the bottom of the analyzer, would it not have a tendency to pitchify more than steam?

Mr. Young: I do not think it would, to any extent. I am satisfied that the water, intimately mixed with the tars, falling on the heated plates, would become volatilized. Consequently, the tars would be kept in circulation and prevented from pitchifying. I can further speak practically as to the likelihood of this action, from experience gained in making our dead oils for lubricating purposes. We have to allow them to flow into a still heated to a high temperature—a temperature above that which would allow the oils to be dangerous in use—and all volatile oils are distilled out, and the heavy oils allowed to flow away from the still by a self-acting overflow, and we pass many thousand gallons through this arrangement without a single trace of deposit on the plates; and we work for months at a time by keeping the oils constantly flowing there.

At this stage Mr. M'Gilchrist's motion was agreed to, and the further discussion adjourned.

The subsequent proceedings of the Association will be given in next number.

Ashbourne Gas Supply.—The local board of Ashbourne have resolved to take the necessary reasonable steps for the purchase of the gas-works, and the clerk has been directed to write to the directors of the company to inquire whether they are willing to sell the works, and, if so, to state the price which would be required.

Southern District Association of Gas Managers.—A meeting of this Association was held at the Bedford Hotel, Southampton Row, London, on Thursday, the 10th inst. Mr. A. H. Wood, of Hastings, presided, and there was a large attendance of members. After some preliminary business, and the election of new members, a very useful paper was read by Mr. Hunter, of Woolwich, "On the Distribution of Coal Gas." This was followed by an animated and practical discussion, lasting until the close of the proceedings, when the further consideration of the subject was adjourned until the next meeting. A vote of thanks was given to Mr. Hunter for his paper.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

All branches of the iron and steel trades have remained quiet during the week, and in some instances there has been a further slight diminution of the amount of work in hand. This has been the case, for the most part, with the iron-works in this immediate neighbourhood, which are chiefly devoted to the production of merchant and ordinary commercial iron, neither of which meets with any demand at present, although prices are down to the lowest possible limit. This may be readily assumed when it is stated that common bars of this district are quoted at very little over £6, delivered either in Liverpool or Manchester. The various classes of pig iron, too, have been easy in price, and are not meeting with any increase of demand. On the contrary, there is now a very quiet sale for the several leading brands of North Lincolnshire pig, not only in respect of forge, but as regards foundry brands. Throughout South and West Yorkshire these brands ordinarily sell very well, but at the present time the call is of the quietest, and such deliveries as are being made are almost exclusively in completion of contracts entered into some time ago. The deliveries hereabouts, too, of Northamptonshire ores are small, although several local concerns are directly concerned in the working of some of the mines there. One local company, however, have given up the area they had leased, the product of the ore being much poorer than had been anticipated.

At several of the collieries, both in Derbyshire and Yorkshire, disputes exist between the miners and their employers on questions affecting reductions from the present rate of wages, which vary, according to local conditions from 2s. to 2s. 9d., for coal-getting. There is not, up to the present time, any general reduction announced, but I believe that such a step is "on the cards," and that the coalowners, as a body, will before long make an effort to get rid of the 5 per cent. which is still paid in excess of the 1871 wages. At some of the steam coal pits there is much more business doing now that the whole of the Baltic and Northern navigation has become freed from ice. Gas coal is also in rather better request, and contracts are being tendered for at 6s. to 8s. 6d. per ton at the pits.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

Trade has been tolerably steady in this district, and what with the Whitsuntide holidays and the threatened strike in West Lancashire, which has been postponed for three weeks, there is every probability of a considerable interference with the local supplies of coal coming into this market, and consumers have naturally been anxious to provide against contingencies by getting in some extra stocks. Higher prices are not being asked, but sellers are generally firm, and it is not at all unlikely that an attempt may be made to obtain some small advance, although any material increase in prices is not probable. Colliery proprietors are now, in some cases, sending out tenders for gas coal; but I fancy there will be, as last season, a good deal of hesitation in settling as to price, as, from what I can learn, consumers are expecting to place their contracts on more favourable terms than coalowners are at present prepared to agree to. The better class of round coal for house fire purposes still meet with a fair demand; common coal is not quite so difficult to sell. Good burgy is also steady, whilst slack continues scarce, and in some quarters an advance is talked of for next month. The average pit prices are about as under:—Good Arley, 9s. 6d. to 10s. 6d. per ton; Pemberton four-feet, 8s. 6d. to 9s.; common coal, 6s. to 7s.; burgy, 5s. to 5s. 6d.; and slack, 4s. to 4s. 9d. per ton.

The notices for the reduction of 10 per cent. in miners wages in West Lancashire, which ought to have expired on Thursday last, have been temporarily withdrawn to enable one or two districts, which were previously holding back, to join in the general action, and the fresh notices will expire in the first week of June. The masters appear to be now more united, and as the men have resolved to resist the reduction, there is every prospect of a struggle for several weeks.

The iron trade continues very depressed, and some of the local makers of pig iron have given way to the extent of about 1s. per ton; but they are still being undersold by makers from other districts. The average quotations for Lancashire pig iron delivered into the Manchester district are 53s. to 56s. per ton for No. 3 foundry, 53s. to 54s. per ton for No. 4 forge, less 2½ per cent. The finished iron trade is very slack, and some of the works are being closed for a greater part of the present week for the holidays. Quotations are without material change, and remain at £6 11s. 6d. to £6 17s. 6d. for bars, according to quality, delivered into the Manchester district.

THE COAL AND GENERAL TRADE OF THE NORTH.

(FROM OUR OWN CORRESPONDENT.)

The gas coal shipments from the Tyne for May are quite as heavy as during the previous months of the spring. The less quantities sent coastwise are compensated by the larger shipments abroad, now that the Baltic is fully open to trade. A good business in the shipment of gas coals was effected last week at the Tyne Dock. Now that summer has really set in, the inquiry for house coals shows a slight falling off, but there have been a good few small coasting orders in the market for gas and house coals. The dispute in the steam coal trade is still unsettled; the notices served upon the pitmen by the masters have a week to run. If some arrangement is not made in the meantime a strike will occur undoubtedly, but most people in the North are sanguine that affairs will not be driven to such an extreme. The matters in dispute, it is hoped, will be settled by arbitration, as usual.

Freights are pretty firm coastwise; they are quoted at from 4s. 6d. to 4s. 9d. for steamers to load coal for London. The Channel and east coast are pretty much about the same in tone. There has been a recovery of about £2 a keel on Mediterranean outward coal rates; the quotation is £20 Genoa, and £20 to £21 Alexandria. Freights generally will keep pretty steady for the remainder of the month, as there is not an excess of steam tonnage in the coasting ports.

The iron trade of the North, it is needless to say, is in a quiet condition. Political affairs were in a more unsatisfactory condition upon the Continent last week than previously, as the change of ministry in France introduced another element of disturbance in them. Trade upon the Continent is highly sensitive, and merchants decline to enter into any business except for immediate requirements.

The chemical markets continue in the same dull state as has characterized them for some time. No improvement is expected while the war continues. It is reported that some manufacturers intend closing their works on the Tyne, as present prices are so unremunerative.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

At the last meeting of the Greenock Corporation Gas Commissioners it was reported that the amount of gas made during last month was 10,213,600 cubic feet, being an increase of 66,300 cubic feet on the same month of last year. Some time ago Messrs. M'Cowan and Biggart, the public analysts of Greenock, gave the results of some experiments they

had made with the view to test the quality and illuminating power of the Greenock gas. These were published after being submitted to the Police Board, and provoked some criticism from Mr. Stewart, the manager of the works, and from Dr. Wallace, of Glasgow. At the meeting just referred to, a letter from the analysts was submitted, stating that while they had every respect for Dr. Wallace as a chemist and as an authority on gas, they could not accept his opinion as in any way affecting the truth of the analyses they had made, and they failed to see how the results of their experiments as on Dec. 27, 1876, ought to be affected by an analysis made by Dr. Wallace on the 9th of March, especially as this was not an examination of the Greenock gas, but merely an analysis of their (Messrs. M'Cowan and Biggart's) analyses.

At the last meeting of the Town Council of Rothesay, held on Monday, the 14th inst., it was reported by the Gas Committee that, while the town was increasing in extent and population, the manufacture of gas had decreased 62,000 cubic feet during the month of April, as compared with the production in the corresponding month of last year. A conversation ensued as to the cause. The decrease has ruled since February, and at a previous meeting, Bailie Montgomerie gave it as his opinion that it was owing to the superior illuminating power of the gas got from a high-priced coal. Another member at last Monday's meeting said that there was more than the dear coal the cause of the decrease; the people were poorer, and did not burn so much gas. The committee were instructed to inquire into the cause.

At the instance of the Police Commissioners of Johnstone, a letter has been addressed to the gas company of that town, intimating their desire to negotiate for the transference of the concern to the Commissioners. Mr. M'Dowall Garthland, the chairman, has replied that he will place the application before the shareholders. A similar step has just been taken by the Police Commissioners of the burgh of Alloa, and it would almost seem as if the two towns were determined to have a struggle for the honour of being the first to take the full benefit of Sir Windham Anstruther's Gas Act. In the meantime they are both in advance of Dumfries.

The annual general meeting of the Innerleithen Gaslight Company was held on Thursday week, when it was resolved, on the recommendation of the directors, to declare a dividend at the rate of 7½ per cent. per annum. A balance was carried forward to the reserve-fund.

It is reported that considerable improvements are in contemplation in connexion with the works of the Helensburgh Gas Company, in order to secure the production of good gas on the best and most approved principles, and a hope has been expressed that, when these improvements take place, the company may see their way to still further reduce the price of gas, and even to raise the quality.

A dividend of 5 per cent. has just been declared by the Aberfeldy Gas Company, and the price of gas has been reduced from 9s. 2d. to 8s. 4d. per 1000 cubic feet.

From the annual report of the Street Lighting Association of Alexandria, Dumbartonshire, which undertakes the lighting of the streets on the voluntary principle, it appears that out of 1091 ratepayers no fewer than 325 do not subscribe anything in aid of the object. The subscriptions for the past season raised in the village amounted to £52 8s. 6d., which did not suffice for doing the work satisfactorily, and the collecting of which, the committee affirm, was a most disagreeable duty. The report recommends that some more equitable way of raising the needful expenses be adopted. In particular it suggests the desirability of adopting some of the clauses of the Burgh Act. A public meeting of the ratepayers is about to be held for the consideration of the matter.

A Dundee journal says that electricity is probably destined to supersede gas as the lighting system of the future, and that another important step has just been taken in its progress to that consummation, the builders of the Tay Bridge having obtained by means of electricity a light equal to that of 2000 candles at a cost of 7d. per hour.

The £1 shares of the Lanark Gas Company, Limited, were recently sold by auction at 21s. each, whereas about four years ago only 10s. or 12s. could be obtained for them. Evidently the Russian electric candle is not regarded with fear amongst the Lanark speculators in gas stock.

It was reported to the Greenock Water Trust last week that the total quantity of water stored in their various reservoirs on the 5th of May amounted to 491,796,382 cubic feet, or 140 days supply for all purposes, which is an increase on the quantity in store at the same date last year.

On the 7th inst., the quantity of water in store for the supply of Glasgow was as follows:—In the lochs, 108 days supply; in Mugdock reservoir, 17 days supply; in Gorbals reservoir, 117 days supply—in all, 242 days supply. The quantity of water sent into the city and suburbs during the preceding fortnight was 34,170,000 gallons per day. The revenue collected up to the date just mentioned was £124,925 11s. 2d., as against £120,089 3s. 4½d. at same time last year, being an increase of £4836 7s. 9½d.

At a meeting of the Burgh Commissioners of Bathgate, held on the 14th inst., it was resolved to borrow £6000 from the Public Works Loan Commissioners to carry out the new water scheme, which is now commenced.

The Corporation of Galashiels have been granted a loan of £40,000 by the Public Works Loan Commissioners, for the execution of the new water-works, at the rate of £4 13s. 4d. per cent. per annum (for fifty years) the same to liquidate both principal and interest.

On Thursday last, a committee of the local authority of the parish of Beath, in Fifeshire, met a deputation from the Police Commissioners of Lochgelly, for the purpose of considering the propriety of entering into a combined scheme for supplying the different villages in the parish with water along with Lochgelly. The plans submitted met with the cordial approval of all present.

The case of *Edington and others, Glasgow, v. The Dundee Water Commissioners*, was again up before Lord Curriehill, in the Court of Session, last Wednesday. It was adjourned in April last for the evidence of Mr. Leslie, of Edinburgh, and Mr. John Page, of Glasgow, who was the inspector for the pipes under Mr. Stewart. At the close of the sitting, it was agreed that the debate upon the evidence, which is expected to last two days, should begin next Thursday.

At a special meeting of the Perth Water Commission, held last Monday, it was agreed to withdraw further opposition to the water Bill, on the ground that the Police Commission take over the Bill at present and carry it out. It is understood that if the Police Commission refuse to do so, the Water Commission are determined to oppose the Bill, and they consider that such refusal would strengthen their opposition. At a joint meeting of the Water Commission and Committee of Ratepayers, held on Wednesday, it was agreed to inform the promoters of the water Bill that, in the event of their allowing the names of the present Police Commissioners to be inserted as First Commissioners, all opposition would be withdrawn.

On Friday last the Edinburgh and District Water Trustees made their annual excursion to examine the works in progress in connexion with the new supply of water from the Moorfoot Hills.

During the past week there was a reduction of 1s. per ton on the price of pig iron warrants in the Glasgow market, and makers generally have reduced the prices of their special brands 6d. and 1s. per ton. The closing quotations for warrants last Friday were—sellers, 54s. 3d.; and buyers, 54s. 2d., cash.

The local coal trade is very dull, and the demand for house coal will be reduced still further, owing to the advent of warm weather. The shipping department is not busy. In some few instances the miners have got back the 6d. that was taken off their day's wages some time ago.

Birmingham Water Supply.—Dr. Hill, the Medical Officer of Health for Birmingham, reports that the water supplied to that town during April, was clear, and exhibited a very marked diminution in the amount of organic matter,

Glasgow Water Supply.—Dr. Mills, of the Andersonian University, Glasgow, reports that the water supplied to that city from Loch Katrine, last month, was almost colourless. It contained suspended particles and some hairy matter, and a minute trace of iron.

Brighton Corporation Water-Works.—The statements of account for 1876, just presented to the council, show a surplus of revenue (£28,034 4s. 4d.) over expenditure (£25,420 10s. 5d.), amounting to £2613 13s. 11d. The items on the expenditure side included "Izard's defalcations, £159 17s. 5d." The committee resolved that £2000 of the surplus should be transferred to the borough fund, and that the balance of £613 13s. 11d. be invested in Three per Cent. Consols, and carried to the credit of the contingent-fund.

Falkirk Joint-Stock Gas Company, Limited.—The following is a summary of the report submitted by the directors of this company to the annual meeting of shareholders on the 15th inst.:—"The directors beg to submit the usual balance-sheet of the company's affairs for the year ending May 15, 1877, from which it appears that a net profit of £913 13s. 6½d. has been earned for the year. This result is considered satisfactory. The directors recommend that a dividend of 5 per cent. on the extended capital of the company should be paid to the shareholders at the Bank of Scotland, Falkirk, on the 1st of June next, free of income-tax. The directors would anticipate even a more favourable result next year, seeing that the large new gasholder, which the company are at present erecting, will be ready for use during the ensuing winter."

Leeds Corporation Gas-Works.—At a meeting of the Gas Committee, on Thursday last, Mr. Woodall, the gas engineer, presented a report (accompanied by plans), in which he recommended the extension and renewal of apparatus at the York Street works, at an estimated cost of £5200. The recommendations included the erection of four purifiers, 30 feet by 20 feet, one scrubber, 60 feet high, and one Körting's steam-jet exhauster to pass 80,000 feet of gas per hour. Mr. Woodall affirmed that by means of these alterations he would be able to add considerably to the producing power of the works by rendering effective 60 retorts which had been previously out of use through the inadequacy of other apparatus. He also expressed his confidence that fully 30 per cent. per annum would be realized upon the proposed expenditure through more economical working consequent thereon. The committee adopted the whole of the engineer's requirements, including the erection of other two 60-feet scrubbers at the Meadow Lane works, at a further cost of £5000.—*Leeds Mercury.*

Gas Explosion in Southwark.—On Tuesday morning, May 15, shortly after 7 o'clock, an explosion occurred at the branch office of the London Joint-Stock Bank, situated near London Bridge, and at the corner of Southwark Street and High Street, Borough. The porter engaged at the bank had occasion to go down into the cellar to procure some coals, having a light in his hand, when suddenly an explosion of gas occurred. Every sheet of plate-glass in the windows and doors on the ground floor was broken, and the force was so great that the iron revolving shutters covering the windows were wrenched from their fastenings. At the time of the explosion a large number of market gardener's waggons were near the spot, and a boy named Elijah Herd was blown into the roadway and run over by a vehicle. Several persons who were passing at the time were also injured.

Liverpool Gas-Fittings Company, Limited.—The first annual meeting of this company was held on Tuesday, the 15th inst., at the offices, Duke Street—Mr. James Lister, deputy-chairman, presiding. The report and balance-sheet showed that upon a capital of £10,000, in £1 shares, fully paid up, there had been a profit during the year of £1636 4s. 9d., out of which the directors recommended that a dividend be declared for the year of 10 per cent., free of income-tax, leaving a balance of £636 4s. 9d. to be carried down to meet any contingencies that might occur from the large amount outstanding, the item "Sundry debtors" on the credit side of the balance-sheet amounting to £5704 9s. 4d. The chairman, in moving the adoption of the report and accounts, said he hoped they would prove as satisfactory to the shareholders as they were to the directors. Mr. J. A. Tinne seconded the motion, which was carried unanimously. The dividend recommended in the report was then declared. Sir Thomas Earle, Bart., and Mr. James Lister, the retiring members of the board, were re-elected, the remuneration of the board, which consists of five members, being fixed at £100 a year. Mr. D. O. Bateson was re-appointed auditor, with a remuneration of £10; and thanks having been voted to the chairman and directors for their satisfactory management of the affairs of the company, and duly acknowledged, the proceedings terminated.

Richmond (Surrey) Water Supply.—At the meeting of the Select Vestry on the 15th inst., a letter from the Local Government Board was read, enclosing a copy of a petition addressed to them, signed by 68 inhabitants of the parish, on the subject of the present water supply. The letter requested that the Board might be furnished with the observations of the vestry on the subject. The petition alleged that the temporary supplies drawn from surface sources would be almost, if not entirely, dried up in hot weather, while the others were quite insufficient to supply the wants of the town, and, after quoting Professor Attfield's analysis of the water, referred to the works in Petersham Meadows, with respect to which the following remarks occurred:—"Your petitioners cannot but regard the action of the vestry in drawing water from the Thames near Richmond, where the river is tidal, and the water contaminated not only by the sewage matters which are brought down from Kingston and other places above Richmond, but also with a vast quantity of such matters which are brought up from London by the flow of the tide—the tidal water, as it flows up, being thick and highly discoloured—as being most deleterious, and calculated to cause epidemics of a serious character, and to be fraught with much danger to the inhabitants of Richmond, more especially if such water is used for any domestic purposes, as it is apprehended may be contemplated by the vestry; but your petitioners submit that even if such water is used for watering the roads, such use may cause much harm and much sickness to result to the inhabitants from the bad smells which must necessarily accompany its use in hot weather and otherwise, from its very nature." The petition further asserted that some considerable time must elapse before the permanent works were completed, and urged that the offer of the Southwark Company to the Kingsbury Committee to supply water into the reservoir at 9d. per 1000 gallons ought to be accepted by the vestry. In conclusion, the petitioners prayed that the Local Government Board would be pleased to take such steps as to them might seem expedient to compel the vestry of the parish of Richmond to furnish an ample supply of pure water to that parish immediately, which, as the Urban Sanitary Authority of such parish, that body had undertaken to do.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, and TWO MEDALS at the PHILADELPHIA EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS;
Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

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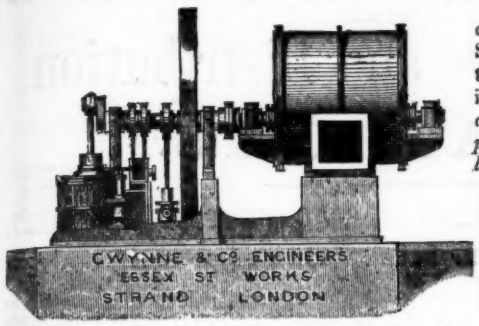
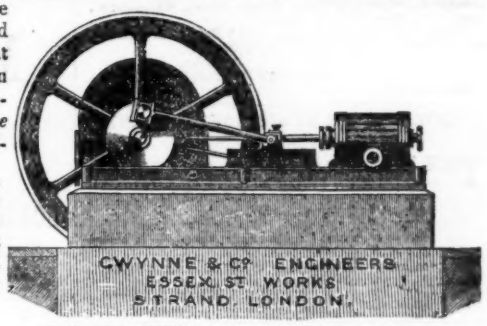


EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 7,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas without oscillation or variation in pressure.
Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers,
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

☞ *G. & Co. are now making 6 Sets Exhausters and Engines for 105,000 cubic feet per hour, 3 Sets 180,000 Exhausters and Engines with many others of all Sizes.*

D. BRUCE PEEBLES & CO.,
ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF **WET AND DRY GAS-METERS;**
Patentees and Sole Manufacturers of "PEEBLES' GAS-GOVERNORS,"
FOR STATIONS, DISTRICTS, DWELLING-HOUSES, AND PUBLIC LAMPS,
OF WHICH UPWARDS OF 90,000 ARE NOW IN SUCCESSFUL USE.

"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*

WANTED, a situation as Practical Retort-Setter, either by day or piece work. Can produce testimonials from several Gas Companies.
Address E. D., 9, Warple Terrace, Warple Way, WANDSWORTH, S.W.

WANTED, a situation in a small single-handed Gas-Works, or where two men are kept, as UNDER MAN.
Address GEORGE PRUTLEY, Shipton, Chipping Norton, OXON.

WANTED, a situation as Manager of a small or medium-sized Gas-Works, by a practical Man. Good testimonials and references.
Address No. 366, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO MAIN LAYERS.

WANTED, at once, a competent Man (lead and turned and bored joints), to lay about three miles of main in the country. References as to ability will be required, and good wages given to a suitable Man.
Address W. A. PLUMBE, Gas Offices, Sutton-in-Ashfield, NOTTS.

WANTED, a re-engagement as MANAGER of a Gas-Works, by a practical Man, who is thoroughly efficient in every department. Good testimonials and references.
Address W. T., care of Mr. F. Barnley, Manager, Gas-Works, Alton, HANTS.

WANTED, a Gentleman with a good connexion amongst Gas Companies, for the SALE of GAS COALS of every description, and Stourbridge Fire-Clay goods. Remuneration, salary or commission, or both, as may be arranged.
Address, in confidence, No. 365, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Working Manager, for a Gas-Works in Lancashire (where the make is about 10 millions annually). Must thoroughly understand the manufacture, distribution, and testing of Gas, also laying mains, fittings, in and out of Works. Residence on Works, with coals, gas, and water, free.
Applications, stating salary required, accompanied by copies of testimonials, to be sent to H., care of G. W. Hughes, Esq., 4, Cable Street, LIVERPOOL.

TO GAS COMPANIES.

WE beg to call attention to our special STEATITE BURNERS for Street Lamps. Sample gross 8s. Quotations for quantities.
Messrs. TINDALL AND TELLING, Gas Apparatus Works, 74, Wynford Road, Penton Street, LONDON, N.

PAMPHLET ON GAS.

COOKING AND HEATING.
HINTS ON GAS-BURNERS, &c.

For GAS COMPANIES to distribute to their Gas Consumers.

Specimen Copy by post Threepence, from the Author,
MAGNUS OHREN, Gas-Works, Sydenham, S.E.

FOR SALE, a Gasometer, 30 feet by 12 feet. Also Hydraulic Condenser, Purifier, &c. All in good condition.
For further particulars, apply to JAMES NORMAND AND SONS, Dysart, FIFESHIRE.

READING GAS COMPANY.

FOR SALE, as they now stand, and at any reasonable price, as the ground upon which they stand is wanted, four 12-ft. square Cast-Iron PURIFIERS, with centre-valve and connexions, grids, tee bars, &c., complete.
Apply to Mr. E. BAKER, Engineer, Gas-Works, READING.

TO BE SOLD, a set of Four Cast-Iron PURIFIERS, 7 ft. square, with wrought-iron Lids; Four Donkin's VALVES, and 8-inch Connexions. All in good condition. No reasonable offer refused.
Apply to D. W. LEES, Manager, Gas-Works, Willenhall, STAFFORDSHIRE.

GASHOLDER FOR SALE.

TO BE SOLD CHEAP, in consequence of the tank being wanted for another purpose, a GASHOLDER about 33 ft. in diameter and 10 ft. deep. To be sold, as it now stands, at any reasonable price. Is in good condition.
Apply to Mr. W. T. HEWS, Gas-Works, HENLEY-ON-THAMES.

GOVERNOR FOR SALE.

THE Dumbarton Corporation Gas De- partment have FOR SALE an 8-in. GOVERNOR, in excellent condition, by Milne and Son, Milton House, Edinburgh.
For further information, apply to the MANAGER, Gas-Works, DUMBARTON.

PRELIMINARY NOTICE.

THE Keighley Local Board of Health purpose SELLING by AUCTION, in the latter part of June, all the surplus GAS PLANT and APPARATUS, at their Old Works, Lin Bridge, Keighley, consisting of 140 Mouthpieces, 18 in. by 15 in., Hydraulics, Dip-Pipes, Exhauster, Tar, Liquor, and Water Pumps, Scrubber, Purifiers, Station-Meter, and other Apparatus, particulars of which will be given in due course.
By order,
JOHN LAYCOCK, Engineer.
May 14, 1877.

THE Newport (Mon.) Gas Company have FOR SALE the following PLANT at their Works, Newport, Mon.:—
Two Cylindrical Boilers, 13 ft. by 4 ft., with fittings complete, and steam-pipes to engines.
Two Horizontal Engines, each cylinder 9½ in. diameter, and stroke of each 1 ft. 6 in.
Two Beale's Exhausters, made to pass 20,000 cubic feet per hour each, with regulators and bye-pass.
The above are in good order, have been working during the past winter, and are now offered for sale because larger ones have been fixed.
Particulars and prices given for the whole or a portion of the Plant on application to the undersigned.
They can be seen at the Works, Mill Street, Newport, Mon.
THOMAS CANNING, Engineer.
May 18, 1877.

BAHIA GAS COMPANY, LIMITED.
NOTICE is hereby given that the ORDINARY HALY-YEARLY GENERAL MEETING of this Company will be held at the Company's Office, 10, Coleman Street, London, on TUESDAY, the 29th day of May, 1877, to receive the Report of the Directors, the Balance-Sheet confirmed by the Auditors, and for general purposes.
The chair will be taken at Three o'clock precisely.
By order of the Board,
ALFRED J. HEAD, Secretary.
May 15, 1877.

GASHOLDER FOR SALE.

ONE Telescopic Gasholder, 70 feet by 20 feet, complete, with cast-iron tank, columns, girders, and inlet and outlet pipes, valves, &c., of modern construction. In first-class condition, and made by Messrs. Piggott and Co., of Birmingham.
To be seen at work at the Gas-Works, Birkenhead.
Cause of removal to make room for extensions.
To be sold a bargain, taken down, and re-erected ready for work.
For particulars, apply to Messrs. ASHMORE AND WHILE, STOCKTON-ON-TEES, or to view to Mr. CALLOW, Gas Engineer, BIRKENHEAD.

BOROUGH OF OLDHAM.

TO MANUFACTURING CHEMISTS AND OTHERS.

THE Oldham Corporation Gas-Works Committee invite TENDERS for the TAR and AMMONIACAL LIQUOR produced at their Oldham, Hollinwood, and Royton Gas Stations, and for the Tar produced at their Higginshaw Gas Station, for the period of One or more years, commencing July 1 next.
Particulars may be obtained on application to Mr. Herbert Andrew, Gas Offices, Oldham.
Tenders to be sent in on or before Tuesday, June 5, 1877.
By order,
H. BOOTH, Town-Clerk.
Oldham, May 16, 1877.

THE Directors of the Horsham Gas Com- pany, Limited, invite TENDERS for a SCRUBBER, to be supplied and erected complete at their Works, in accordance with the following particulars:—
The Scrubber to be of cast iron, 6 ft. diameter and 24 ft. high, with the requisite man-holes and plates, and all necessary screw bolts and nuts.
Three tiers of Wooden Sieves, 3 inches thick.
Nine-inch Inlet and Outlet.
An Overflow Liquor Pipe and Three Taps—viz., one Gauge Tap, and two draw-off Taps, one for Tar and one for Liquor. All to be placed as may be directed by the Company's Engineer.
A Water Distributor and Tank complete.
The Company will, at their own expense, execute all foundations and brickwork to raise the bottom of the Scrubber about 3 ft. above the surface of the ground.
The Company will also provide and fit up all Valves and Connexions, and Liquor Pump.
Parties tendering to name time for completion, and to send drawings and specifications, which will be returned if not accepted.
Sealed tenders, endorsed "Tender for Scrubber," to be sent to the undersigned on or before Saturday next, the 26th inst.
ROBERT SHEPPARD, Secretary.
Horsham Gas Company, Limited, May 17, 1877.

BOROUGH OF SOUTHPORT.

TO IRONFOUNDERS.

THE Corporation are prepared to receive TENDERS for the supply and erection of RETORT-MOUNTINGS and HYDRAULIC MAINS required at their Gas-Works, at Crowland's, near Southport.

Plans and specifications may be seen at the Office of Mr. George Anderson, 35A, Great George Street, Westminster, and at the Town-Hall, Southport.

Tenders to be sent to me, endorsed "Retort Mountings," on or before Friday, the 25th day of May inst.

By order,
KEIGHLEY WALTON, Town-Clerk.

May 19, 1877.

CARDIFF GASLIGHT AND COKE COMPANY.

AMMONIACAL LIQUOR.

THE Directors of this Company are pre- pared to receive TENDERS for the AMMONIACAL LIQUOR produced at their Works in Cardiff, for One, Two, or Three years, from June 30, 1877.

Sealed tenders, endorsed "Tender for Ammoniacal Liquor," to be forwarded to the undersigned, on or before the 6th day of June next.

Any further particulars may be obtained upon application at the Company's Offices.

HENRY BOWEN, Engineer.

Gas Offices, Cardiff, May 12, 1877.

TO CONTRACTORS, GASHOLDER-TANK BUILDERS, AND OTHERS.

THE Directors of the Phœnix Gas Com- pany are prepared to receive TENDERS for the construction of a GASHOLDER-TANK in Brick, at their Greenwich Works.

Drawings may be seen, and specifications and full particulars obtained at the Offices of the Company, Greenwich, on application to Mr. P. J. Water, the Engineer.

Tenders are to be sent in, on or before Tuesday, the 5th of June next, endorsed "Tender for Gasholder-Tank, Greenwich," and addressed to the Secretary, Mr. I. A. CROOKENDEN, 70, Bankside, LONDON.

The Board do not bind themselves to accept the lowest or any tender.

May 18, 1877.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Corporation of Birmingham invite TENDERS for the purchase of the surplus TAR produced at their Works, Adderley Street (in quantity about 2500 tons per annum), for One, Two, or Three Years, from July 1 next.

Delivery free into the purchaser's boats, at the Gas-Works.

Tenders, which must be at a price per ton of 200 gallons, for monthly cash payments, to be sent in not later than Saturday, the 2nd of June next, endorsed "Tender for Gas Tar," and addressed to the Chairman of Works Sub-committee, Gas Offices, Old Square, Birmingham.

The Committee do not bind themselves to accept the highest or any Tender, and may require reasonable security for the due fulfilment of the Contract.

Any further information may be obtained on application to Mr. CHARLES HUNT, at the Gas-Works, WINDSOR STREET.

Birmingham, May 15, 1877.

TENDERS FOR GAS COAL.

THE Directors of the Londonderry Gaslight Company invite TENDERS for the supply of 4000 tons of best GAS COALS, *ex* ship to their Works during the next Twelve months.

Tenders to be sent to the undersigned not later than Twelve o'clock on Tuesday, the 29th inst.

JOHN MACNIE, Manager and Secretary.

Gas-Works, Londonderry, May 19, 1877.

TENDER FOR COALS.

THE Malvern Link Gas Company are prepared to receive TENDERS for the supply of 500 Tons of Kirkless Hall Wigan GAS COALS, to be delivered at the Works, Malvern Link, between the 1st of June next and the 25th of March, 1878.

Tenders to be sent to the Chairman of the Gas Company, Malvern Link, by the 25th of May.

The lowest or any tender will not necessarily be accepted.

W. UNDERWOOD, Secretary.

Gas-Works, Malvern Link, May 14, 1877.

BOROUGH OF DARLINGTON.

THE Gas-Works Committee invite TENDERS for the supply of COAL suitable for Gas purposes.

Tenders to state the price per Ton for the supply of 10,000 Tons, the whole quantity required, commencing the 1st of July next; also, the price per Ton for 5000 Tons, to be delivered during the Six months commencing the 1st of July next. The Coals to be delivered at the Stockton and Darlington Railway Depôt, Darlington.

Further particulars as to time and rate of delivery may be obtained from Mr. William Smith, Gas-Works Manager, Darlington.

Tenders, endorsed "Tender for Gas Coal," to be sent to me on or before Monday, the 28th inst.

No pledge is given that the lowest or any tender will be accepted.

By order,
HUGH DUNN, Town-Clerk.

Darlington, May 7, 1877.

BOROUGH OF BURY.

TO COLLIERY PROPRIETORS AND OTHERS.

THE Gas-Works Committee of the Cor- poration of Bury are prepared to receive TENDERS for GAS COAL and CANNEL for One year, commencing the 1st of August next, to be delivered free at the Railway or Corporation Siding, Bury, as may be required. Estimated quantity 13,000 to 14,000 tons of Coal; 3000 to 4000 tons of Cannel.

Further particulars may be obtained on application at the Gas-Works, Elton, near Bury.

Tenders, endorsed "Tender for Coal and Cannel," addressed to His Worship the Mayor, Gas-Works, Elton, to be sent not later than Thursday, the 7th of June next.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
F. BULL, Town-Clerk.

Corporation Offices, Bank Street, Bury,
May 17, 1877.

Now ready, price One Shilling, No. 6 (to be continued Monthly) of

A TREATISE ON THE SCIENCE & PRACTICE

OF THE

Manufacture and Distribution

OF

COAL GAS.

LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET,

OR OF ANY BOOKSELLER IN TOWN OR COUNTRY.

For the convenience of persons resident in remote districts, arrangements have been made by the Publisher to forward the "Treatise" by Post, securely packed on a roller, at the cost of the number and postage only—viz., 1s. 2d. Monthly, or 7s. for the Half Year.

Now ready, Second Edition, price 7s., by post 7s. 3d.,

THE

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, A.I.C.E.

The scope of this work is apparent from its title. The First Edition, published a few years ago, was eagerly sought for, and has been now for some time out of print. The favourable reception accorded to it sufficiently proved that it supplied a generally acknowledged want in the profession. The work has undergone careful revision; much new matter has been added; and the New Edition is published in fcap. 8vo., morocco, gilt.

"This may be fairly described as among the most useful manuals of its class."—*Iron.*

"Gas managers will find it a very useful companion."—*Chemical News.*

"The new edition is published in a small octavo form, which makes it a handy book, either for the pocket or the desk."—JOURNAL OF GAS LIGHTING.

"An excellent little book."—*Mr. R. H. Patterson (late Gas Referee) in the* JOURNAL OF GAS LIGHTING, *April* 28, 1874.

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WILLIAM B. KING,

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Just Published, Price 2s. 6d.,

COMMON SENSE FOR GAS USERS,

Being a Catechism of Gas Lighting for Householders, Gas-Fitters, Architects, Engineers, Millowners, &c.

By ROBERT WILSON, C.E.

CROSBY, LOCKWOOD, & CO., 7, STATIONERS HALL COURT, E.C.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

LONDON OFFICES: 1, WESTMINSTER CHAMBERS, S.W.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—All Communications to be addressed to the FIRM ONLY.

J. EDMUNDSON & CO.,

19, GREAT GEORGE STREET, WESTMINSTER,
LONDON, S.W.,

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS.

CONTRACTORS FOR THE

ERECTION OF GAS-WORKS, GAS-FITTINGS, &c.,

FOR TOWNS, COUNTRY MANSIONS, &c.

Estimates given free of Charge.

Now ready,

THE GAS & WATER COMPANIES DIRECTORY
FOR THE YEAR 1877,

EDITED BY

CHARLES W. HASTINGS,

8, BUCKINGHAM STREET, ADELPHI, LONDON, W.C.,

CONTAINS

An Alphabetical List of Towns in England having Gas or Water Companies.
Date of Formation of the Company.
If Incorporated under Special Act of Parliament, and the date of such Act or Acts.
If under any of the Limited Liability Acts.
Amount of Share Capital.
Name of Chairman.
Name of Engineer or Manager.
Name of Secretary.
If Let on Lease, Name of Lessee.
If a Private Venture, Name of Owner
If Purchased by the Corporation (and in cases where possible the date of such Purchase), or if the Property of the Local Authorities.
Population of all Towns.
Railway Communication, and the Distance from London.
Special Notice is taken of all the Members of the "British Association of Gas Managers."

THIS WORK IS UNDER THE PATRONAGE OF ALL THE LEADING GAS & WATER ENGINEERS AND SECRETARIES OF THE METROPOLITAN & PROVINCIAL COMPANIES.

Price 5s. in Cloth Covers; by post, 5s. 2d. | Price 3s. 6d. in Paper Covers; by post, 3s. 8d.

PUBLISHED BY MESSRS. MARCUS WARD & CO., OF LONDON AND BELFAST.

J. & J. BRADDOCK,

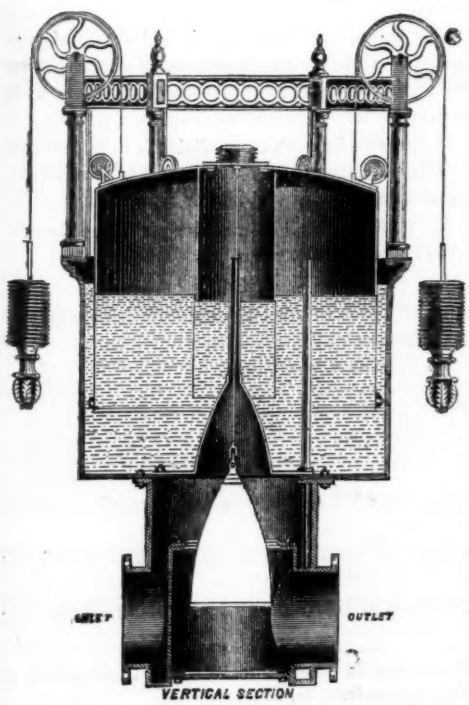
GLOBE METER-WORKS,

OLDHAM,

Beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.

THE Directors of the Cheltenham Gas-light and Coke Company invite TENDERS for the supply of the best quality of CANNEL and COAL for making gas, for One or Three years from the 1st day of July next.

Quantities and conditions of contract can be had on application to the undersigned, to whom tenders must be sent on or before the 31st inst.

The Directors do not bind themselves to accept the lowest or any tender.

R. O. PATERSON, Engineer.

Gas-Works, Cheltenham, May 5, 1877.

TO COLLIERY PROPRIETORS AND OTHERS.
TENDERS FOR COAL.

THE Directors of the Merthyr Tydfil Gas Company solicit OFFERS for the supply of best quality large screened GAS COAL for a period of One, Two, or Three years, to be delivered at their Gas-Works, Picton Street, Merthyr Tydfil, free of all costs of carriage, terminal charges, and haulage at Merthyr between the station and works, in such quantities as the Manager may from time to time require.

Tenders, endorsed "Coal," to be addressed to the Secretary (from whom particulars may be obtained), on or before Tuesday, the 5th day of June next.

JOHN L. COCKER, Secretary and Manager.

Gas Offices, Picton Street,
Merthyr Tydfil, May 5, 1877.

TENDERS FOR GAS COAL.

THE Victoria (Newmarket) Gaslight and Coke Company, Limited, invite TENDERS for the supply of 1600 Tons of Best Screened GAS COAL, free from bats, dirt, &c. (21 cwt. to the Ton) to be delivered at Newmarket Railway Station, as required, during the next twelve months ending May 31, 1878.

Parties tendering must give full particulars of the Coal offered, and state the name of the Colliery from which it is to be supplied.

Tenders to be sent to the undersigned on or before the 28th day of May inst.

The directors do not bind themselves to accept the lowest or any tender. By order,

THOMAS WILKINSON, Manager.

Gas Office, Newmarket, May 12, 1877.

WIGAN GAS-WORKS.

THE Gas Committee of the Corporation are prepared to receive TENDERS for the supply of 50,000 Tons of Best GAS COAL, and 5000 Tons of CANNEL, delivered at the Gas-Works, in such quantities as may be required by the Manager, during the Two years from the 1st day of July, 1877, to the 1st day of July, 1879.

Tenders to be addressed to Mr. J. G. Hawkins, Gas-Works, Wigan, endorsed "Tender for Coal" or "Cannel," as the case may be, on or before the 4th day of June next. Tenders not endorsed will be rejected.

The Committee do not bind themselves to accept the lowest or any tender.

MASKELL WM. PEACE, Town-Clerk.

May 10, 1877.

TO MANUFACTURING CHEMISTS, TAR DISTILLERS, &c.

THE Directors of the Barnsley Gas Company are desirous of receiving TENDERS for the purchase of the surplus COAL TAR produced at the Works at Barnsley and Old Mill, for a term of One or Three years, commencing from July 1 next.

Probable quantity and any other particulars on application to the undersigned.

Tenders addressed to the Chairman to be sent to me not later than Thursday, the 31st day of May inst.

JOHN HUTCHINSON, Manager.

Gas Office, Pontefract Road, Barnsley, May 10, 1877.

TO LIME BURNERS, MERCHANTS, &c.

THE Directors of the Barnsley Gas Company are desirous of receiving TENDERS for the supply of the whole of the LIME required at their New and Old Works at Barnsley, for purifying purposes, for One or Three years, commencing from July 1, 1877; the same to be delivered into the lime-sheds at both Works respectively.

Any further particulars may be had on application to the undersigned.

Tenders, addressed to the Chairman, to be sent to me not later than Thursday, the 31st day of May inst.

JOHN HUTCHINSON, Manager.

Gas Office, Pontefract Road, Barnsley, May 10, 1877.

TO COLLIERY OWNERS, &c.

THE Directors of the Barnsley Gas Company hereby invite TENDERS from parties willing to contract to supply and deliver into the retort-houses, at their Works, situated at Old Mill and Pontefract Road, Barnsley, respectively, any quantity not exceeding 11,000 Tons per annum of screened SOFT COAL or NUTS of the best quality, suitable for Gas-making, that they may require for a period of One, Two, or Three years, as may be agreed upon, from the 1st day of October, 1877. The said Coal to be delivered in a dry condition, free from smudge, dirt, shale, pyrites, or other impurities, at either of the said works, in such quantities and at such times as the Manager may direct. There are railway sidings into both works.

Sealed tenders, stating respectively the price of Coal delivered as above, endorsed "Tender for Coal or Nuts," and addressed to the Chairman, must be left at the Gas Company's Offices, on or before Thursday, the 31st day of May inst.

Any further information required may be obtained on application to the undersigned.

The Directors do not bind themselves to accept the lowest or any tender.

By order,

JOHN HUTCHINSON, Manager.

Gas Offices, Pontefract Road, Barnsley, May 10, 1877.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

HENRY LYON,

ENGINEER,

AND

CONSULTING GAS ENGINEER,

BARTON HOUSE, opposite BARTON ARCADE,

DEANSGATE, MANCHESTER.

BOLTON CORPORATION.—GAS DEPARTMENT.

CONTRACTS FOR CANNEL AND COAL.

THE Gas Committee are desirous of receiving TENDERS for CANNEL and Best GAS COAL, for the year commencing the 1st of July next, to be delivered free at the Bullfield or Craddock Lane sidings of the Lancashire and Yorkshire Railway, at Bolton, or, if carted, at the Gas Street or Lum Street Works, as may be required.

Sealed tenders, endorsed "Tender for Coal," specifying the description of Cannel or Coal, the pits at which they are to be raised, and the quantities proposed to be supplied, to be sent to the undersigned, at or before Ten o'clock a.m., on Monday, the 28th inst., stating also cash terms for monthly payments.

The Committee do not bind themselves to accept the lowest or any tender, but the person or persons whose tender may be accepted, will be required to execute an agreement for the due performance thereof.

By order,
R. G. HINNELL, Town-Clerk.

Gas Offices, Bolton, May 11, 1877.

BRISTOL UNITED GASLIGHT COMPANY.

SPECIFICATION AS TO SUPPLY OF COALS.

THE Directors of the Bristol United Gaslight Company invite TENDERS for the supply of from 90,000 to 100,000 Tons of GAS COALS, during the Twelve months between the 1st of July, 1877, and the 1st of July, 1878, for use at the Works, situate respectively at Avon Street, St. Philip's, and Canon's Marsh, Bristol.

The Coal to be partly small and partly large or brush, and to be delivered in such monthly proportions as may be required in accordance with the season. The quality of the Coals must be good, dry, and free as possible from sulphur, bats, bind, refuse, and dirt.

Full particulars required of the Coals for which tenders may be submitted; and the Directors will be glad to receive chemical analyses thereof, and any information in relation to their properties for the manufacture of Gas.

Parties tendering must state the maximum quantities of either small, large, or brush Coal they will undertake to deliver monthly, and it must be understood that the Directors are to be at liberty to accept the terms offered for any lesser quantities they may think fit.

Tenders to state the prices per ton f.o.b. (port of shipment to be named), or delivered at the Railway Station, Bristol, or at the Company's Gas-Works, Avon Street, or Canon's Marsh, and discount for cash monthly payments.

Payment will be made in accordance with the weight (20 cwt. to the Ton), as weighed upon the weigh-bridge of the Gas Company at their respective Stations.

Sealed tenders, to be addressed to the Chairman of Directors, Bristol United Gaslight Company, Canon's Marsh, Bristol, marked "Tender for Gas Coal," and delivered not later than Tuesday, the 5th of June next.

HENRY H. TOWNSEND, Secretary.

Gaslight Offices, Bristol, May 11, 1877.

TENDERS FOR COALS.
SPECIFICATION.

THE Derby Gaslight and Coke Company are prepared to receive TENDERS for the supply of 24,000 tons of SOFT COALS and SOFT COBBLES or NUTS, to be divided into Three Contracts, of 8000 tons each, and to be delivered in the following monthly quantities, viz.:—

1877—	June	500
	July	700
	August	800
	September	900
	October	900
	November	900
	December	900
1878—	January	800
	February	700
	March	500
	April	400
	Total of each Contract	8000

The Company will undertake to receive from the party or parties contracting the total quantity of 24,000 tons, in One, Two, or Three Contracts, as the Board may decide; but they do not bind themselves to accept the lowest or other tender or tenders, until after a satisfactory trial of the Coals and Cobbles or Nuts to which such tender or tenders may relate shall have been made. They are to be the best of their kind, and as free as possible from sulphur, bats, bind, refuse, and dirt, and shall be weighed upon a correctly adjusted machine.

Payments will be made monthly, if, and so long as, the Contracts shall be duly fulfilled, to the extent of nine-tenths of the amount of the invoices, and the balance will be discharged on the satisfactory completion of the Contract.

Sealed tenders (to be made on forms obtainable at the Company's Office), specifying the description of Coals and the pits at which they are to be raised, and stating the prices for delivery by canal at Derby at the New Gas-Works, adjoining the Midland Railway Company's premises, or at the Canal Wharf, and also the price delivered at either of the Midland Railway Stations, Derby, and in manner and subject to the conditions aforesaid, must be delivered at the Offices of the Company, Friar Gate, on or before Saturday, the 2nd day of June next.

The respective contracting parties will be required to execute an agreement to be prepared by, and to the satisfaction of, the Secretary of the Company.

By order of the Directors,
ISAAC FISHER, Secretary.

Derby Gas Office, May 19, 1877.

PATRONIZED BY THE ROYAL ARSENAL, WOOLWICH.

FERGUSON, Builder and Contractor. Kite method of Repairing Church Spires and High Chimneys. Chimneys straightened, pointed, and hooped. Old Chimneys pulled down by a process requiring no scaffolding or stoppage of work, by competent workmen, under personal supervision. For Lightning Conductors—cheapness and method of fixing—apply to C. R. FERGUSON, 18, Canal Road, MILE END.

WILSON'S
PATENT SAFETY PRESSURELESS
AUTOMATIC DIP-PIPES,

Fixed or moveable, adapted to works of any size, without other alteration than removal of existing Dips.

W. P. WILSON, 98, ASYLUM ROAD, S.E.

TO GAS COMPANIES AND THE TRADE.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRONZED, & ORMOLU CHANDELIERS, IMPROVED CRYSTAL STAR & SUN LIGHTS, VESTIBULE LAMPS, AND THE PATENT CRYSTAL ILLUMINATION.

A LARGE STOCK ALWAYS IN HAND OF

IRON, BRASS, COMPOSITE, AND LEAD TUBES, FOR GAS AND WATER,

AND EVERY DESCRIPTION OF

GAS AND WATER FITTINGS.

THE PATENT DRY AND WET METER, WITH THE LATEST IMPROVEMENTS.

STREET LAMPS AND COLUMNS IN GREAT VARIETY.

WORKS: LONDON AND BIRMINGHAM.

GAS MOONS, Cut and Engraved, of the newest designs

GAS REFLECTORS In Silver and Glass

GAS NIBS AND **BURNERS** Of every description.

Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1876, are now complete.

City Show-Rooms and Manufactory, 147, HOUNDSDITCH, LONDON.

ESTABLISHED 1830.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

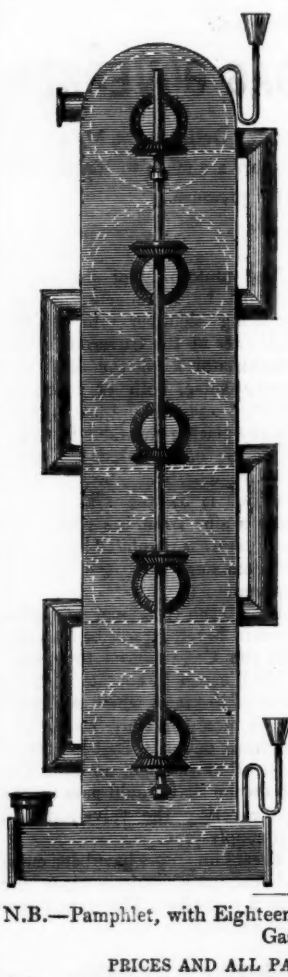
35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.

ANDERSON'S

PATENT

COMBINED WASHER AND SCRUBBER.



TESTIMONY OF ITS ACTION.

The Gas-Works, St. Albans,
April 27, 1877.

DEAR SIR,

Your Brush Scrubber has been in action here for four months.

It removes the whole of the ammonia from the gas, so that it will not discolour moistened turmeric paper.

The brushes cause no appreciable increase of pressure, and there is no repumping of liquor. Clear water run in at top, issues from the bottom fit to proceed to the sulphate-house.

It performs its work more efficiently than the tower scrubber I have, while only about half the height, and not one-fourth its weight or capacity.

My purifiers also last much longer before they are foul than they did previously.

I am, yours truly,
A. F. PHILLIPS.

G. Anderson, Esq.,
35*a*, Great George Street, S.W.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Eighteen Illustrations and Letterpress on the Construction of Gas-Works, post free, 2s. 6d.

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

35a, GREAT GEORGE STREET, WESTMINSTER, S.W.

GAS PURIFICATION.

BAILES & HALLSWORTH,

CONTRACTORS FOR THE

PURIFICATION OF COAL GAS,

BY THEIR

PATENT OXIDE OF IRON COMPOUND.

The material is in use at most of the principal Gas-Works in Yorkshire and elsewhere. It contains considerably less moisture than natural Oxide of Iron. It is much cheaper and more efficient as a purifying agent.

B. & H. are purchasers of Spent Oxide, or will take Spent in exchange for New Material.

FOR SAMPLES AND TERMS, ADDRESS—

BAILES & HALLSWORTH, COPPERAS WORKS, ARMLEY, LEEDS.

GEORGE NEWTON,

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MANUFACTURER OF

SQUARE STATION-METERS, with PLANED JOINTS;

ROUND STATION-METERS, WITH CAST-IRON STANDS;

WET AND DRY CONSUMERS GAS-METERS, GOVERNORS, &c.

SAM. CUTLER & SONS,

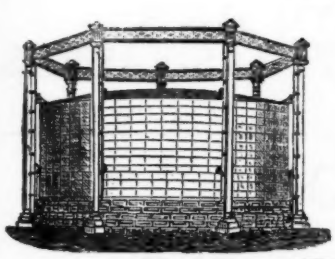
CONTRACTING GAS ENGINEERS,

GASHOLDER & GENERAL GAS APPARATUS MAKERS,

MANUFACTURERS OF

BOILERS, IRON ROOFING, IRON BRIDGES,

AND GENERAL IRONWORK.



S. C. AND SONS undertake Contracts of any magnitude for the **Erection of new and Remodelling of existing Gas-Works**, for **Gasholders, Cast and Wrought Iron Tanks, Iron Roofs**, and every description of **Apparatus** for the Manufacture and Distribution of Gas.

Special attention is invited to their **"Improved Condenser,"** which is very effective, and much approved; also to their patterns of **Annular** and other **Condensers, Scrubbers,** and **Purifiers,** of all sizes, which they arrange either with **Centre** or Ordinary **Slide Valves.**

WORKS FOR THE SUPPLY OF

VILLAGES, MANSIONS. FACTORIES, &c.

S. C. AND SONS undertake the **Supply** and **Laying** of **Mains** for **Gas and Water,** and supply all Castings, Connexions, and Fittings for Retort-House, Works generally, and for Streets. They also supply **Valves** of all descriptions, Iron and Clay Retorts, Hotpressed Retort-Lids, Steel Charging-Scoops of improved make, for which they have special machinery, Improved Coke and Coal Barrows, Cross-Bars and Screws, Bolts and Nuts, Furnace and Stoking Tools, Iron and Wood Purifier-Sieves, Lead, Yarn, Borings, &c., including every requisite whatsoever for a Gas-Work, a well-assorted stock being kept of those goods most in request.

SOLE MAKERS OF BRETT'S PATENT COKE BARROW.

Experienced Retort Setters sent to any part of the Kingdom.

Address: PROVIDENCE IRON-WORKS, MILLWALL, LONDON.

ALFRED LASS,

SPECIAL ACCOUNTANT FOR GAS COMPANIES,

30, GRACECHURCH STREET, LONDON.

Accounts analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by A. L. to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.

The above forms are registered.

Water Companies Accounts also prepared and adjusted.

CONSULTATIONS.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

CATHELS'S Patent District Dry Gas-GOVERNOR is the only perfect self-acting contrivance for Regulating the Pressures in the higher levels of a district.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS & TERRACE'S Patent Four-WAY DISC GAS-VALVE is the simplest and best Valve for Purifiers, and as a By-pass for other apparatus in Gas-Works. It is always gas-tight, and has no springs, ground faces, or other delicate parts. By its use the flow of the gas cannot be accidentally stopped, and it never sticks.

For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, Foundry and Brass Works, ROTHERHAM.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of

CLAY RETORTS, FIRE-BRICKS, AND EVERY DESCRIPTION OF FIRE-CLAY GOODS

BOUCK & CO., LIMITED,

TAR DISTILLERS & MANUFACTURING CHEMISTS,

MILES PLATTING, MANCHESTER.

BUYERS OF COAL TAR,

And Crude Products therefrom,

AMMONIACAL LIQUOR, &c.

W. HAILES,

FURNACE BUILDER AND RETORT-SETTER,

Contracts for the

BUILDING AND SETTING OF RETORT BENCHES,

In large or small works, at home or abroad;

Also to supply all kinds of

FIRE GOODS AND IRONWORK

Necessary for the Erection of Retort-Beds.

The greatest amount of heat by the smallest possible amount of fuel is the principle of the settings.

ADDRESS:

No. 3, High Street, Brentford, MIDDLESEX.

YEO'S PATENT ENGINE PACKING AND IMPROVED YARN FOR GAS AND WATER PIPE JOINTS.

EPHRAIM YEO, Inventor, Patentee, and Sole Manufacturer of the Patent Excelsior Self-Lubricating Rope Engine Packing, price 1s. 8d. per lb., any size. Carriage paid on ½cwt. and upwards to any Railway Station in the Kingdom. Best Tarred Spun-Yarn for Gas-Pipe Joints, 28s. per cwt. Best White Ditto, any size, 36s. per cwt. Best Ditto, boiled in Oil and Tallow, 36s. per cwt. Coke Sacks, any length or width, Tarred or Untarred. Carriage paid to any Railway Station in the Kingdom. Address—

E. YEO, NEWTON ABBOT, DEVONSHIRE.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14½-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

THE TYNE COAL COMPANY, LIMITED, OWNERS.

W. RICHARDSON, Fitter,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

WILSON CARTER & PEARSON,
GAS COAL AND CANNEL FACTORS,

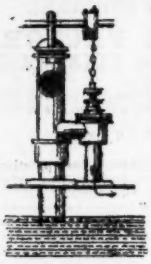
Supply to any Railway Station or export Best Wigan Arley Gas Coal and Nuts; best qualities of the Derbyshire, Yorkshire, and North Staffordshire Gas Coals and Nuts; also the best descriptions of Lancashire, Welsh, Scotch, and other Cannel.

Messrs. WILSON CARTER & PEARSON, being contractors to several of the principal Gas Companies in the Midland Counties, have pleasure in being enabled to give them as references.

Chief Offices: Temple Buildings, 50, New Street, Birmingham.

London Offices: 6, Great Winchester St. Buildings, E.C.

COPP'S PATENT ANTI-DIP GAS APPARATUS.



Produces from 10 to 20 per cent. more gas of higher illuminating power.
Prevents the deposit of carbon.
Retorts last much longer.
Charges work off quicker.
This simple invention has been in use in many works for the last six months, with the above results.

PRICE 2 GUINEAS EACH.

Testimonials and particulars on application.

Address **WALTER L. COPP,** WATCHET, SOMERSET.

GRIRDROD'S PATENT PORTABLE PIPE SCREWING MACHINE,

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,
ALBION WORKS, SALFORD, LANCASHIRE.

LAMBERT'S CAST-IRON GAS-MAIN COCKS,
WITH PATENT WHITE METAL PLUGS.

TRADE (L) MARK.

No. 758. No. 759.

The bodies of these Taps are made of iron, black or galvanized, and the plugs of patent metal. They are warranted not to set fast or corrode, as do Iron or Brass Cocks; will always work easily; are strong, well made, durable; of little or no intrinsic value, and therefore not likely to be stolen; and the prices as stated below are (especially upon the larger sizes) fully 50 per cent. less than Brass Cocks.

	½	¾	1	1¼	1½	2-inch.
No. 758, with inside screws for iron pipe, black	2/0	3/0	4/4	6/6	7/6	12/0 each.
No. 759, with union on one end screwed inside for iron pipe, black	2/9	3/10	5/4	8/0	9/0	15/6 each.
Nos. 758 and 759, galvanized	0/3	0/4	0/6	0/8	0/10	1/4 extra.

MANUFACTORY:
SHORT STREET, LAMBETH, LONDON.

F. & C. OSLER,
45, OXFORD STREET, LONDON, W.
MANUFACTORY AND SHOW-ROOMS:
BROAD STREET, BIRMINGHAM.
ESTABLISHED 1807.
MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS
WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.
TABLE GLASS OF ALL KINDS.
CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS

CATHELS'S
IMPROVED RETORT-SETTINGS.
GUARANTEED TO HEAT AND WEAR WELL, WITH GREAT ECONOMY OF FUEL.

Coloured lithograph copies of WORKING DRAWINGS of Beds of One to Seven Retorts (so clearly arranged and fully shown as to be easily understood by any retort setter or bricklayer) having been made of these valuable settings, they can now be supplied with detailed SPECIFICATION immediately on receipt of orders.

APPLY TO
MR. THOS. NEWBIGGING,
CONSULTING GAS ENGINEER,
5, NORFOLK STREET, MANCHESTER.

S. OWENS & CO.,
WHITEFRIARS STREET, LONDON, E.C.,
HYDRAULIC ENGINEERS,
AND MANUFACTURERS OF
PUMPING MACHINERY of every Description.
SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF
BLAKE'S PATENT STEAM-PUMPS,
More than 10,000 in use,
ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.
The following are some of the prominent advantages of the BLAKE PUMP:—

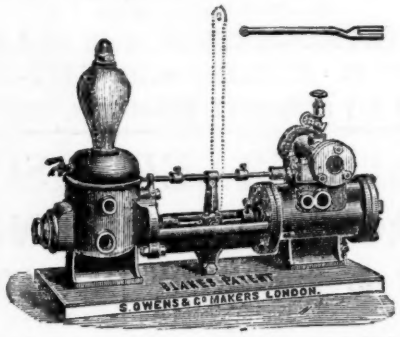
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

SOLE MANUFACTURERS OF
MANN & OWENS
IMPROVED PATENT GAS-VALVES.

PRICED LISTS AND FULL PARTICULARS FURNISHED ON APPLICATION.

GAS PURIFICATION.

H. O. COOKE & CO.,
OXIDE MERCHANTS,
79, MARK LANE, LONDON, E.C.,
Are now supplying the best natural Oxide of Iron that has yet been brought into the market.

THE WIGAN COAL & IRON COMPANY,
LIMITED.

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN;

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS PURIFICATION & CHEMICAL Co., LIMITED.

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

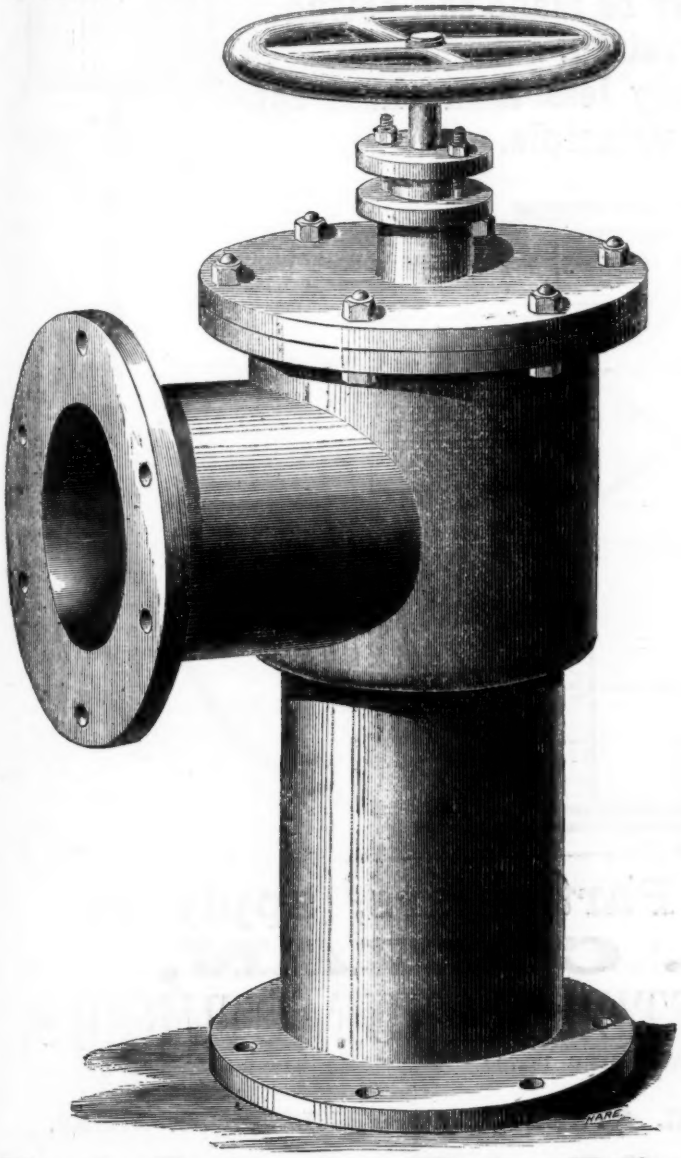
CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL, SAMUEL H. JOHNSON. } Joint Managing Directors.

GEORGE WALLER & CO.,

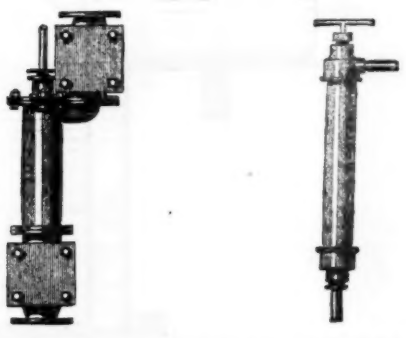
GAS ENGINEERS AND CONTRACTORS.



IMPROVED

DISC GAS-VALVE.

These Valves have been specially designed by G. W. and Co. for BEALE'S EXHAUSTERS. They have Faced Joints and Flanges and Turned Hand Wheels, and can be had with Spigot at base if required



TAR AND LIQUOR PUMPS,

3-inch to 6-inch,

WITH DRIVING GEAR,

ALWAYS IN STOCK.

ALSO SYPHON AND VARIOUS OTHER HAND PUMPS.

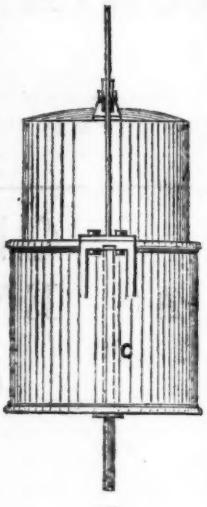
Phœnix Engineering Works, Holland Street, Southwark, S.E.

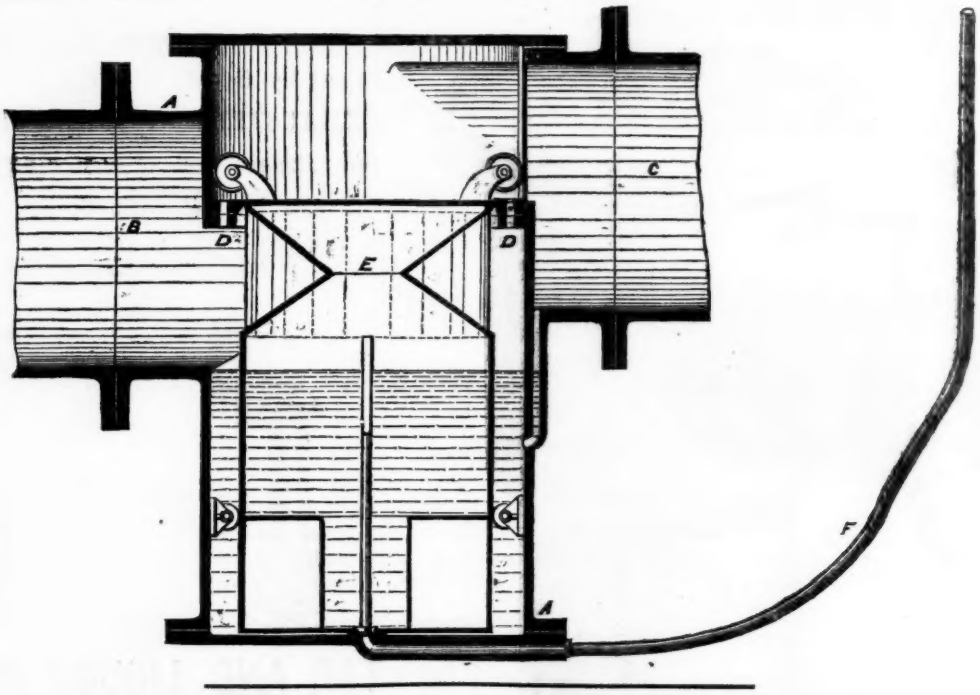
FOULIS'S
PATENT STATION & DISTRICT GAS-GOVERNOR.

For Description, see "Journal of Gas Lighting," May 1, 1877.

These Governors possess the following Advantages:—

1. They are much smaller than any other, being no larger than an ordinary water-trap for the same size of main.
2. The moving parts are few and light, thus ensuring great sensitiveness in action.
3. They may be placed anywhere underground in the line of pipe, and regulated from any distance, or for district purposes they may be made self-acting.
4. No house or covering is required.
5. The prices are considerably less than those constructed on the ordinary principle.





For Prices and Particulars, apply to
W. & B. COWAN,
WET & DRY GAS-METER MANUFACTURERS,

(ESTABLISHED 1827,)

CHURCH STREET, MILLBANK STREET, **LONDON, S.W.**

FENNEL STREET, MANCHESTER.

BUCCLEUCH ST. WORKS, **EDINBURGH.**

1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.

1862 LONDINI HONORIS CAUSA

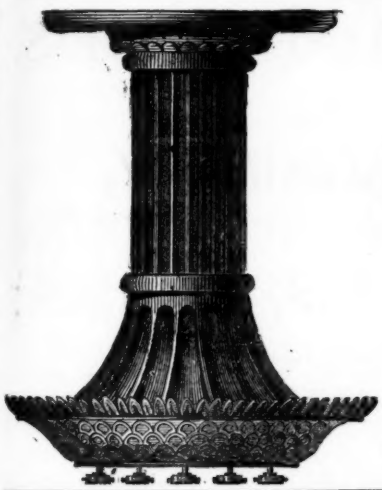
This Paint having been in general use over fifteen years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

The following Gas Companies in London have used the Paint for years—viz., The Gaslight and Coke, Imperial, Independent, City of London, Commercial, London, and Surrey Consumers.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

SPECIAL DRIERS FOR ANTIMONY PAINT SUPPLIED.



HENRY GREENE & SON,

GAS AND HOT WATER ENGINEERS,

155, CANNON STREET, E.C.

Manufactory: 19 & 20, NICHOLAS LANE, E.C.

SUN-BURNERS,

With Regulating Valves to obviate down draught.

MEDIÆVAL & OTHER GAS-FITTINGS

For Churches and Domestic Use.

ARCHITECTS' OWN DESIGNS WORKED OUT.

ESTIMATES FREE OF CHARGE.

THE TRADE SUPPLIED.

SOLE CONSIGNEES FOR BRÖNNER'S IMPROVEMENTS IN GAS LIGHTING.

IN THE MATTER OF

BRÖNNER'S GAS-BURNERS.

HENRY GREENE AND SON, 155, Cannon Street, London, Sole Agents for Great Britain, Ireland, and Colonies, of Brönner's Improvements in Gas Lighting, beg to inform the public that on the 13th of January, 1876, Julius Brönner obtained an injunction in the Court of Session, Scotland, against Donald M'Vean, Gas-Fitter, 14, Newton Street, Glasgow, prohibiting him from in any way advertising or offering for sale as Brönner's Burners, any Burner not manufactured by Julius Brönner, or from in any way inducing the public to believe that the said Donald M'Vean sells or keeps for sale Brönner's Burners, manufactured by Julius Brönner, while such is not the case.

Also that on the 9th of November, 1875, he obtained injunction in the same Court, and in the same terms, against R. M. Brechin and Co., 46, North Hanover Street, Edinburgh.

Also that on the 20th of April, 1875, in a suit in Chancery, before Vice-Chancellor Malins, number 1874, B 365, he obtained injunction against another defendant, in the same terms and on similar grounds.

MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

IMPROVED CENTRE-VALVES,

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

WEST'S GAS IMPROVEMENT COMPANY,

LIMITED,

ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,

And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

A Pamphlet containing a description of the Machinery, and Copies of Reports on the working of the same, &c., will be forwarded on application to the MANAGING DIRECTOR, Maidstone. Communications may also be addressed to the Consulting Engineer, R. P. SPICE, Esq., M. Inst. C.E., 21, Parliament Street, London, S.W., or to the Engineer and Analyst, F. W. HARTLEY, Esq., A. Inst. C.E., 55, Millbank Street, London, S.W.

JOHN ABBOT AND CO.,

LIMITED,

IRON AND BRASS FOUNDERS,

PARK WORKS, GATESHEAD-ON-TYNE.

London Office: 2, SUFFOLK LANE, CANNON STREET.

Glasgow Office: 54, ST. ENOCH'S SQUARE.

MANUFACTURERS OF ALL DESCRIPTIONS OF

HYDRAULIC MACHINERY,

INCLUDING

ACCUMULATORS, FORCE-PUMPS, CRANES, & LIFTS,

FOR

GAS-WORKS, WAREHOUSES, &c.

IMPROVED HYDRAULIC MACHINERY,

Specially Arranged for Lifting and Lowering Purifier-Covers, &c.

MAKERS OF

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS;

PIPES FOR GAS AND WATER WORKS;

ROOFS, COLUMNS, AND GIRDERS.

DESIGNS AND ESTIMATES SUPPLIED ON APPLICATION.

THOMAS ALLAN & SONS,

IRONFOUNDERS,

WORKS:

SPRINGBANK FOUNDRY & NORTH WOODSIDE FOUNDRY,

GLASGOW;

BONLEA FOUNDRY, STOCKTON-ON-TEES,

Manufacturers of

CAST-IRON GAS AND WATER PIPES.

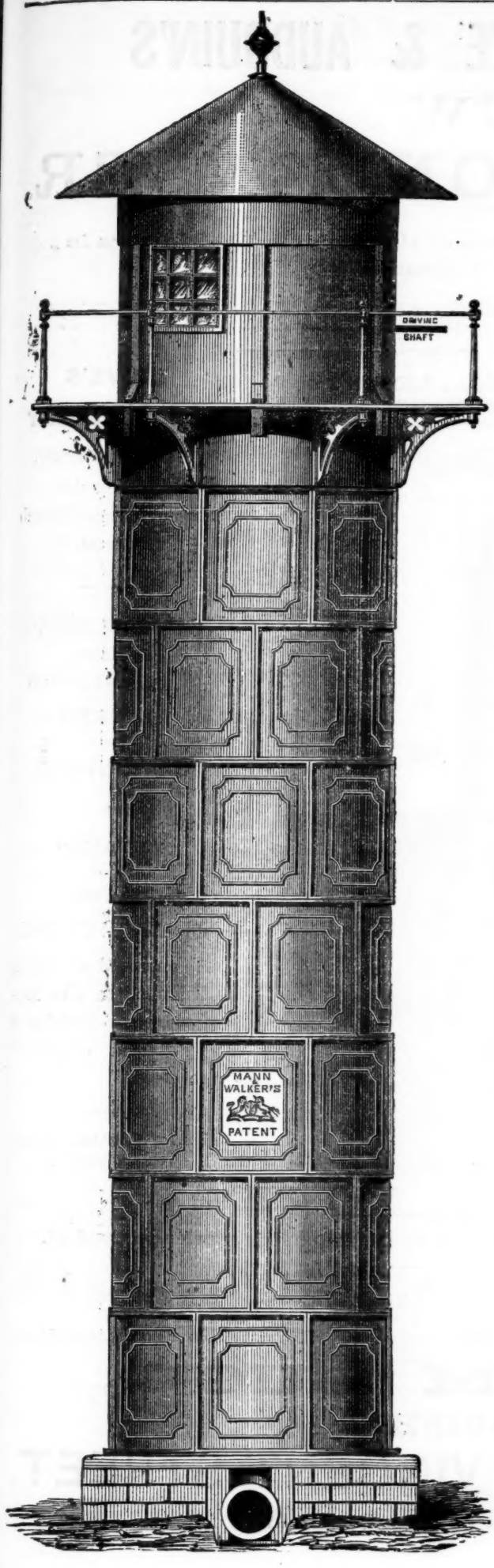
SIZES: ¾ to 12 inches at GLASGOW.

„ 1½ to 7 „ STOCKTON.

A LARGE STOCK KEPT, AND PRICES MODERATE.

Freight to London, in the Stream, 10s. per ton from Stockton; 12s. 6d. from Glasgow.

London Agent: Mr. A. C. FRASER, ST. STEPHEN'S CHAMBERS, TELEGRAPH STREET.



C. & W. WALKER,
8, Finsbury Circus,
London, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. and W. Walker, 8, Finsbury Circus, London, E.C., or to Mr. William Mann, late Superintendent of the Chartered Gas-Works, Blackfriars, London; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

MESSRS. PELOUZE & AUDOUIN'S
NEW
PATENT CONDENSER,

For the Mechanical Condensation of the Liquefiable Matters in Gases or Vapours.

WILLIAM SUGG'S

PATENT

ILLUMINATING

POWER METER

For showing the Illuminating Power of Gas by the observation of one minute.

£26s. 10s. COMPLETE.

THE "LONDON"

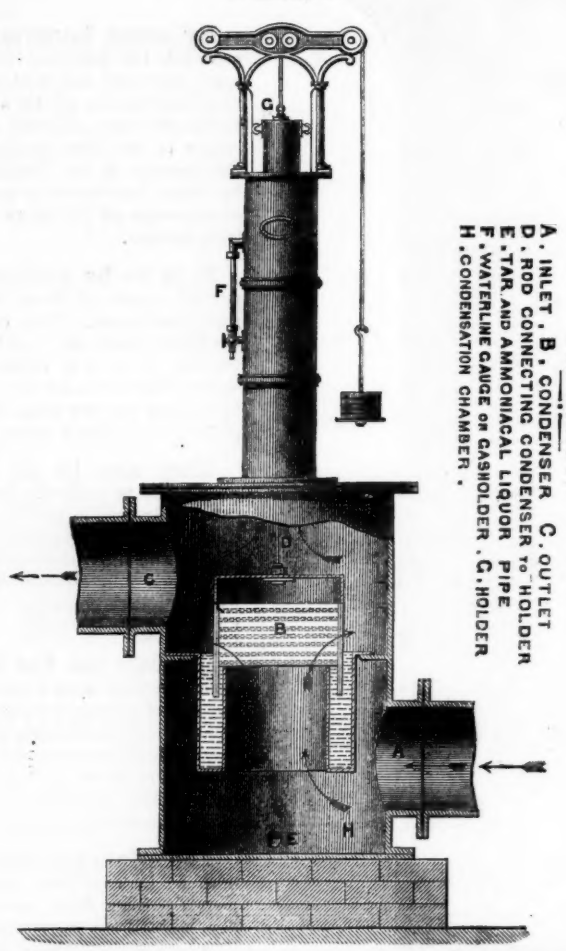
Standard Burner,

"GAS REFEREES MODEL,"

For 14-candle and 16-candle gas, as certified by the Board of Trade, is now ready.

Prices and Description of above will be sent on application.

MESSRS PELOUZE AND AUDOUIN'S
PATENT CONDENSER.



LOWE'S

Jet Photometer

(KIRKHAM & SUGG'S IMPROVED),

Suitable for the English and French systems.

WILLIAM SUGG'S

PATENT

Street-Lamp

METERS

AND

GOVERNORS.

"EVANS"

AND

"LETHEBY"

PHOTOMETERS,

As approved of by the Metropolitan Gas Referees and Standards Department of Board of Trade.

Lists of above will be sent on application.

*** **This Condenser is being largely used on the Continent, and is much approved of.**

SOLE AGENT FOR ENGLAND,

From whom Prices and all Particulars may be obtained on application,

WILLIAM SUGG,
GAS ENGINEER,
VINCENT WORKS, VINCENT STREET,
WESTMINSTER, S.W.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

LESMAHAGOW CANNEL COAL.

FERRAND DAVIES,

148, GRESHAM HOUSE, OLD BROAD STREET, LONDON, E.C.,

SOLE AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL.

Quotation and Analysis forwarded on application.

G. J. EVESON,

GAS COAL AND CANNEL FACTOR,

Has on offer, and for immediate delivery, in quantities to suit purchasers, Best Wigan Arley Mine, Orrell Screened and Unscreened Gas Coal and Nuts; Best Yorkshire, Real Old Silkstone, Derbyshire, and North Staffordshire Screened and Unscreened Gas Coal and Nuts; also Best Lancashire, Yorkshire, Derbyshire, and other Cannel, as supplied to some of the principal Gas Companies in England, to whom references are permitted.

Analysis and Prices forwarded on application to

HEAD OFFICES, STOURBRIDGE.

N.B.—Gas Managers will oblige by advising when they will be prepared to receive Tenders.

STOURBRIDGE FIRE-BRICKS, RETORTS, CLAY, &c.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

173, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full Analyses on application.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,

CANNEL COAL MERCHANT,

HAYMARKET, EDINBURGH.

Established 1840.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c., &c.,

SCOTSWOOD FIRE-BRICK WORKS,

SCOTSWOOD-ON-TYNE.

SILKSTONE GAS COAL

AND

LANCASHIRE AND MIDLAND CANNEL.

EMOR G. WRIGLEY, Merchant,

Having made arrangements with four large Collieries for the exclusive sale of their GAS COAL and CANNEL, can offer to Gas Companies large quantities, for delivery over one or two years, at exceedingly low prices. His REAL OLD SILKSTONE GAS COAL will give, in regular work, 10,200 feet 16·6 candle gas and 13 cwt. superior coke; and a WIGAN CANNEL 11,375 feet 21·75 candle gas and 12 cwt. superior coke.

PRICES AND ANALYSIS WILL BE FORWARDED TO ANY PART ON APPLICATION TO THE CHIEF OFFICE,

120a, STAMFORD STREET, ASHTON-UNDER-LYNE.

ALBERT GAS COAL.

THE DERBYSHIRE

SILKSTONE COAL COMPANY,

LIMITED,

CAN OFFER A

GAS COAL

Of superior quality, delivered at any station in England and Wales.

Purified gas per ton of coal in cubic feet (average)	10,775
Weight of coke in lbs. per ton of coal	1,465

ANALYSIS AND PRICES ON APPLICATION TO

Mr. EDMUND TAYLOR, Secretary,

ALBERT COLLIERY, NEWBOLD, NEAR CHESTERFIELD.

THE SILKSTONE & DODWORTH COAL & IRON COMPANY, LIMITED,

DODWORTH, BARNSLEY.

BENJAMIN WHITWORTH, Esq., M.P. . . . . Chairman.
Mr. RICHARD HARTLEY . . . . . Managing Director.

REAL OLD SILKSTONE GAS COAL.

JAMES PATERSON, Esq., Gas Engineer, of the Warrington Gas Company, reported, Aug. 10, 1875:—

"This Coal possesses remarkable qualities as a gas and coking coal, and appears SECOND TO NONE IN THE KINGDOM. It contains the large quantity of 699 lbs. of illuminating matter, and 1498 lbs. of coke to the ton, and produces **12,240** cubic feet of 16·66 candle gas."

The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

THE

WIGAN & WHISTON COAL COMPANY,

LIMITED,

(COLLIERIES—PRESCOT, NEAR LIVERPOOL)

Are now prepared to supply their

RUSHY PARK GAS COAL,

Either to Gas-Works in England or Wales, or for Shipment, at Runcorn, Garston, Birkenhead, or Liverpool.

This Coal is of superior quality, and yields in practical working over 10,000 cubic feet of Purified Gas per ton, with an Illuminating Power of 17½ candles.

One Ton of Coal yields 1441 lbs. of good Coke.

For prices, &c., apply either direct to the Colliery or to the Company's Office,

195, FALKNER STREET, LIVERPOOL.

J. & G. WELLS, Limited,

ECKINGTON COLLIERIES,

NEAR CHESTERFIELD.

BEST SILKSTONE GAS COAL,

CANNEL, and NUTS,

Of very high Illuminating Power, and giving a large yield of excellent Coke.

Further Particulars on application to the Secretary.

NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS AND COLLIERIES,

NEAR SHEFFIELD.

CELEBRATED SILKSTONE GAS COALS.

The various descriptions of Gas Coal produced from the above Collieries possess an unequalled reputation, combining in a large degree the constituents essential for the production of the best quality of Coke and Gas of a high illuminating power.

A recent extensive development of the Collieries enables us to offer increased supplies.

JAS. PATERSON, Esq., of Warrington, after testing various qualities of our Coal, has sent the following testimony of their merits:—

Warrington Gaslight and Coke Company,
Offices, Mersey Street, Warrington, April 23, 1877.

Messrs. NEWTON, CHAMBERS, AND CO.,

Gentlemen,

After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

The average of Nine samples gives a yield of 12,500 cubic feet of 15½ Candle Gas, being equivalent to 664 lbs. of sperm per ton, and 1420 lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

Yours truly,

JAMES PATERSON.

Full particulars will be sent on application to us—address as above.

NEW PATENT WET GAS-METER,

THE "RELIANCE,"

MANUFACTURED BY THE

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON; UNION STREET, OLDHAM; HANOVER STREET, DUBLIN.

The object attained by this invention is the *correct measurement of Gas under every fluctuation of the pressure.*

Accuracy is obtained by subjecting the whole of the water which determines the measuring chambers of the drum to one uniform even pressure, and so prevents unequal displacements of the water-line.

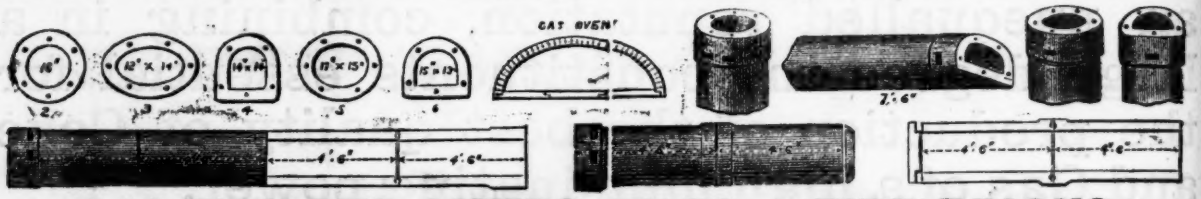
The "RELIANCE" METER has been tested by several of the most experienced official meter inspectors. Copies of their reports may be obtained on application to the

GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON.

HARRIS & PEARSON,

FIRE-CLAY AND BRICK WORKS, STOURBRIDGE.



GAS-RETORTS, LUMPS, TILES, & FIRE-BRICKS,

OF EVERY DESCRIPTION.

A LARGE ASSORTMENT OF GAS-RETORTS IN STOCK.

STOCK FOR EXPORT READY AT THE WORKS, AND AT ELLESMERE PORT.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW,

SOLE MAKERS OF

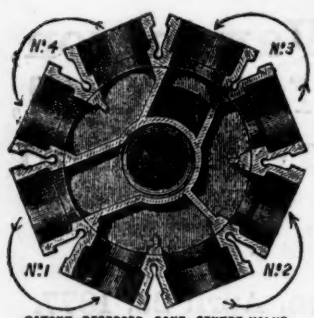
PATENT

RECESSED CONE CENTRE-VALVES,

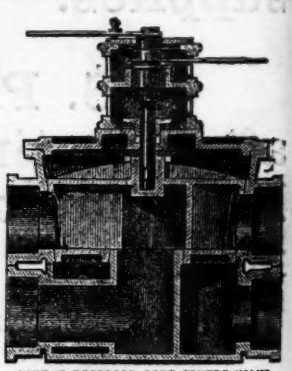
Constructed on the principle of the ordinary Plug-Cock.

THROUGH-WAY & FOUR-WAY COCKS

Of all descriptions.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Plan.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Elevation.

LONDON OFFICE: 106, CANNON STREET.

D. HULETT & CO.

Invite the attention of Gas Companies, Corporations, and others to their

PATENT STREET LAMPS,

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London: Printed by WILLIAM BOUGHTON KING (at the office of Clayton and Co. 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, May 22, 1877.